

*Independent Oversight Evaluation of  
Headquarters and Albuquerque Operations Office  
Management of*

*Environment, Safety, and Health Programs at*

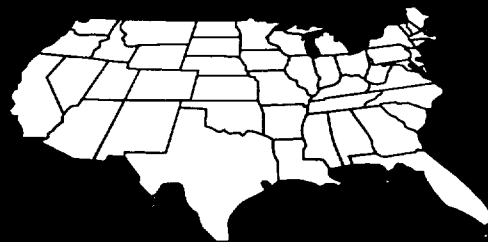
# **The Pantex Plant**

October 1996



*Office of Oversight*

Environment  
Safety  
Health  
Safeguards  
Security



Department of Energy

**Office of Environment, Safety and Health**



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Headquarters and Albuquerque Operations  
Office Management of Environment,  
Safety, and Health Programs at  
The Pantex Plant**



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U.S. Department of Energy**



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## EXECUTIVE SUMMARY

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**EVALUATION:** The Department of Energy (DOE) Office of Environment, Safety and Health independent oversight organization evaluated safety management with respect to three of the DOE's guiding principles for safety management: 1) line managers are responsible and accountable for safety; 2) comprehensive requirements exist, are appropriate, and are executed; and 3) competence is commensurate with responsibility.

**SITE:** The Pantex Plant

**DATES:** August to October 1996

### BACKGROUND

This Oversight evaluation selectively sampled various environment, safety, and health (ES&H) programs at the Pantex Plant. The Pantex Plant is managed by the Albuquerque Operations Office (AL), with programmatic direction provided by the DOE Headquarters Offices of Defense Programs (DP) and Environmental Management (EM). AL's Amarillo Area Office (AAO) provides a continuous onsite DOE presence and day-to-day direction to contractors at the Pantex Plant. Under contract to DOE, the Pantex Plant is operated by Mason & Hanger (M&H). Oversight's evaluation of Pantex reflects the performance of the line management chain responsible for the Pantex Plant site—DP, AL, AAO, and M&H.

Located in the Texas panhandle, the Pantex Plant is primarily a nuclear weapons assembly and disassembly facility. This mission requires the Pantex Plant to dispose of the non-nuclear components of nuclear weapons and safely and securely store the plutonium pits on an interim basis pending final disposition. The ongoing activities at the Pantex Plant are important to national defense and national commitments, and they involve inherent hazards, including large quantities of nuclear materials and high explosives, that must be carefully managed and controlled.

### RESULTS AND CONCLUSIONS

Safety management at the Pantex Plant is generally effective, and improvements continue to be made to enhance the protection of workers, the public, and the environment. The most significant safety improvement initiative is the Stockpile Stewardship for the 21st Century (SS-21) process, in which worker hazards are thoroughly analyzed and mitigative actions are designed into weapons disassembly activities. AL has championed application of the SS-21 process to weapons disassembly projects; AAO and M&H implementation of this process has resulted in safer and more efficient work practices.

The Pantex Plant management, particularly within AAO and M&H, has effected positive changes in the safety culture at the Pantex Plant over the past three to four years, with a demonstrated commitment to safety down through the organization from senior managers to the workers in the plant. M&H has established some noteworthy practices to ensure accountability for performance. For example, first-line supervisors of employees who are injured on the job are required to personally brief the General Manager. This practice reinforces the accountability of supervisors for the safety of their employees.

AAO and M&H have recognized weaknesses in their employee concerns programs and have taken a number of actions to strengthen them. The results of Oversight's interviews of a sample of the workforce noted that the workers felt they were working in a safe environment and that they were confident of

management's desire to resolve safety concerns. AAO and M&H managers have acknowledged that some previous employee safety concerns were not handled well, and they have taken corrective actions. Management is aware of the workers' perceptions and appears genuinely committed to addressing them. Oversight saw no evidence that management at AL, AAO, or M&H encouraged or tolerated retaliation against workers for raising safety concerns.

Although safety management programs are generally effective, additional improvement is needed in some areas. Most notably, there are continuing instances of procedural non-compliances, configuration management is not rigorous, and assessment and issue management programs do not consistently provide managers with timely and useful feedback. Particular attention is needed to address coordination between ES&H and nuclear explosives safety, as well as the underlying factors that are hindering the development of standards/requirements identification documents and safety analysis reports.

Overall, the Pantex Plant safety management system is effective. DOE and M&H management have positioned the Pantex Plant to attain the Department's goal of integrated safety management. Although there are weaknesses in some of the programs needed to ensure that comprehensive requirements are in place and executed, AAO and M&H managers have a good understanding of remaining weaknesses in the current systems and, in most cases, have appropriate plans to correct them. Further, there are a number of program strengths, such as a well trained and qualified workforce, that compensate for the identified deficiencies such that the overall safety management program is effective.

#### **OPPORTUNITIES FOR IMPROVEMENT**

The following opportunities for improvement have been identified. These opportunities are not prescriptive but may contribute to the success of the integrated safety management program.

1. Enhance communications, coordination, and cooperation among DP, AL, AAO, and contractor management by clarifying roles, responsibilities, interfaces, and lines of authority.
2. Develop integrated implementation strategies and procedures that enable DOE senior managers to direct and measure the effectiveness of the various ongoing ES&H initiatives.
3. Increase organizational and individual accountability for ES&H performance within DOE.
4. Develop and implement management systems that provide information on ES&H performance and that assist management in identifying and resolving programmatic ES&H issues.
5. Strengthen the DP, AL, AAO, and M&H management commitment for transition from an "expert-based" to a "standards-based" system of operation.
6. Clarify DP, AL, AAO, and M&H organizational interfaces to further enhance integration of ES&H into nuclear explosives operations.
7. Improve the visibility of AAO's and acceptance of M&H's employee concerns programs.

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## ACRONYMS AND INITIALISMS

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AAO	Amarillo Area Office
AL	Albuquerque Operations Office
BIO	Basis for Interim Operations
BMI	Battelle Memorial Institute
CSSM	Critical Safety System Manual
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
DP	U.S. Department of Energy Office of Defense Programs
EH	U.S. Department of Energy Office of Environment, Safety and Health
EM	U.S. Department of Energy Office of Environmental Management
ES&H	Environment, Safety, and Health
FAR	Functions, Assignments, and Responsibilities
HAR	Hazards Analysis Report
HIT	Hazard Identification Teams
M&H	Mason and Hanger/Silas Mason Co.
OTMO	Office of Technology Management and Operations (AL)
SAR	Safety Analysis Report
S/RID	Standards/Requirements Identification Document
SS-21	Stockpile Stewardship for the 21st Century Initiative
SWAP	Safe Work Award Program
TNRCC	Texas Natural Resources Conservation Commission
TSR	Technical Safety Requirement
VPP	Voluntary Protection Program

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# **Independent Oversight Evaluation of Headquarters and Albuquerque Operations Office Management of Environment, Safety, and Health Programs at The Pantex Plant**

## **1.0 INTRODUCTION**

An independent oversight safety management<sup>1</sup> evaluation of the Albuquerque Operation Office's (AL's) Pantex Plant was conducted from August through October 1996 by the Office of Oversight, U.S. Department of Energy (DOE). The purpose of the evaluation was to determine how effectively DOE and contractor line management<sup>2</sup> have implemented safety management and environment, safety, and health (ES&H) programs at the Pantex Plant.

This evaluation was conducted as part of the Department's independent oversight program, which was consolidated in December 1994 under the Office of Environment, Safety and Health (EH) into the Office of the Deputy Assistant Secretary for Oversight. A major objective of the Office of Oversight is to provide the Secretary of Energy; DOE program, field, and contractor managers; the Assistant Secretary for Environment, Safety and Health; Congress; and the public with accurate and comprehensive information on and analysis of the effectiveness of the Department's ES&H programs.

The DOE Headquarters Office of Defense Programs (DP) is the cognizant secretarial office for the Pantex Plant, and is primarily responsible for program development and direction of most activities reviewed during the evaluation. In addition to DP, the DOE Headquarters Office of Environmental Management (EM) has ongoing environmental restoration and waste management at the Pantex Plant.

AL is responsible for managing activities at the Pantex Plant, as well as a number of other major and smaller sites. AL is located in Albuquerque, New Mexico, and has area offices at each of its major sites.

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<sup>1</sup>Safety management refers to those measures required to ensure that an acceptable level of safety is maintained throughout the life of a facility or installation. The term "safety" when used in the context of safety management or safety management program specifically includes all aspects of environment, safety, and health programs.

<sup>2</sup>Line management refers to the unbroken chain of command that extends from the Secretary through the Under Secretary to the cognizant secretarial officers, field organization managers, and contractors. Line management consists of DOE and contractor personnel organizationally or contractually responsible for work or job tasks, as well as effective safety.

*The Office of Oversight evaluated safety management programs at the Albuquerque Operations Office (AL) Pantex Plant from August through October 1996.*

*Headquarters Defense Programs (DP) is the cognizant secretarial office for the Pantex Plant.*

*AL manages activities through area offices at Pantex.*

AL's Amarillo Area Office (AAO) provides day-to-day direction to contractors and a continuous onsite presence at the Pantex Plant. Some ES&H functions are performed by AL personnel in Albuquerque, while other ES&H functions have been delegated to the area offices. The Pantex Plant operations are conducted for DOE by Mason & Hanger (M&H). As a subcontractor to M&H, Battelle Memorial Institute (BMI) performs most ES&H functions at the Pantex Plant.

Figure 1 shows a simplified depiction of the roles and responsibilities of the various organizational entities involved in the Pantex Plant line management chain. Oversight's evaluation of the Pantex Plant reflects the performance of the line management chain responsible for the Pantex Plant—DP, AL, AAO, M&H, and BMI.

The Pantex Plant is a nuclear weapons assembly and disassembly facility. In addition to its nuclear weapons stockpile mission (i.e., assemble and disassemble, repair and retrofit nuclear weapons; and demilitarize and sanitize components from dismantled nuclear weapons), Pantex Plant also provides interim storage for plutonium pits from dismantled nuclear weapons and develops, fabricates, and tests chemical explosives and explosive components for nuclear weapons. Although the Pantex Plant is primarily a production<sup>3</sup> facility, Pantex Plant performs some research involving explosives. In addition, Pantex Plant has facilities in various stages of their life cycle: design, construction, operations and maintenance, decontamination and decommissioning, and environmental restoration.

Table 1 provides an overview of the facilities, programs, and focus areas that were evaluated. It also summarizes the principal hazards at the facilities reviewed for this Oversight evaluation.

Oversight's evaluation approach is based on the fundamental premise that line managers are responsible for managing safety through proper work planning, hazards analysis, and hazard control. The fundamental safety principles need to be implemented in all types of work and at all types of facilities, regardless of mission and life cycle phase. Further, it is essential that all activities be performed within a well defined safety envelope and governed by an appropriately graded approach to procedures, commensurate with hazards.

The adequacy of the systems, processes, and procedures managers use to assure environmental protection and worker health and safety are assessed against a set of clearly defined principles and accompanying

*Pantex Plant carries out missions in nuclear weapons stockpile maintenance and other defense-related activities.*

*In all facilities, safety measures must be commensurate with hazards.*

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<sup>3</sup>For simplicity, "production facilities" is used to represent facilities with a production, processing, assembly/disassembly, staging, and/or storage mission.

Primary Role

Program Direction  
Funding

Program Management  
Technical Support  
Pilot Assessment

Onsite Presence  
Day-to-day Direction  
Assessments

Program Implementation  
Facility Management  
ES&H Implementation

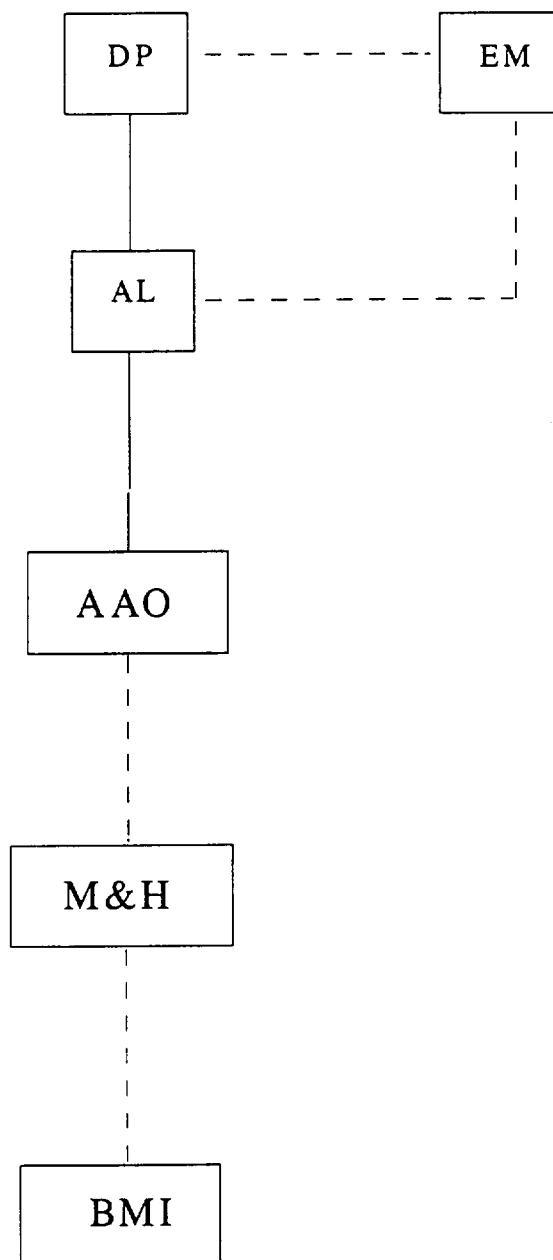


Figure 1. The Pantex Plant Safety Management Organizations

**Table 1. Pantex Facilities and Hazards**

<b>SITE OVERVIEW</b>	<ul style="list-style-type: none"> <li>■ Located on the high plains of the Texas Panhandle, 17 miles northeast of Amarillo just north of U. S. Highway 60 in Carson County.</li> <li>■ Covers 16,000 acres.</li> <li>■ There are a total of 3,600 DOE and contractor employees.</li> <li>■ The annual budget for fiscal year 1995 was \$294 million.</li> <li>■ The more than 400 buildings at the Plant are divided into several functional areas, commonly referred to as zones.</li> <li>■ The zones include a weapons assembly/disassembly area, a storage/staging area for nuclear materials and high explosives, an area for experimental explosive development, an explosive test-firing facility, a burning ground for burning explosive materials, and landfills.</li> </ul>
<b>FACILITIES REVIEWED</b>	<ul style="list-style-type: none"> <li>■ Zone 4 - storage of plutonium pits (which are the core of a nuclear fission weapon), staging of weapons, and storage of high explosives</li> <li>■ Zone 12 - W55 and B61 bays and cells - dismantlement process for two types of weapons, one of which (the B61) is the prototype of the way Pantex intends to plan work in the future</li> <li>■ Zone 11 - Buildings 11-36, 11-39, and 11-50 - high explosive synthesis, chemical storage, and machining</li> <li>■ Groundwater - various remediation locations</li> </ul>
<b>HAZARDS</b>	<ul style="list-style-type: none"> <li>■ Pantex has over 66 metric tons of plutonium, including Department of Defense quantities.</li> <li>■ Other radioactive materials include significant quantities of uranium, tritium, and thorium.</li> <li>■ The large quantities of chemical high explosives also present a significant hazard that must be rigorously controlled.</li> <li>■ Chemical hazards include various acids, solvents, flammable liquids, and limited quantities of materials such as beryllium.</li> <li>■ Work in areas with high voltage, heavy equipment, high energy steam, or rotating machinery also presents hazards.</li> </ul>

criteria.<sup>4</sup> The three guiding principles of safety management that are applicable to line management are:

- Line managers are responsible and accountable for safety.
- Comprehensive requirements exist, are appropriate, and are executed.
- Competence is commensurate with responsibility.

This generic framework can accommodate a wide range of operations, hazards, and management styles and is suitable to both research and operational facilities.

Section 2 presents the most significant evaluation results and Oversight's assessment of the effectiveness of the safety management programs at the Pantex Plant. Section 3 identifies and discusses

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<sup>4</sup>Five guiding principles are identified in the DOE's letter: line management responsibility for safety, comprehensive requirements, competence commensurate with responsibilities, independent oversight, and enforcement. The last two are performed by the Office of Oversight and other Departmental elements. The evaluation of the Pantex Plant, therefore, focused on their effectiveness in implementing the first three of the five guiding principles, which are directly applicable to line management.

opportunities for enhancing safety management programs affecting Pantex Plant facilities.

Appendix A provides additional details on the evaluation approach, criteria, rating system, and process and identifies the members of the Oversight evaluation team. It contains the full text of the evaluation criteria, which serves as a template for an effective safety management program and provides important detail for readers who are not already familiar with the guiding principles of safety management and associated criteria.

## 2.0 RESULTS

This section provides an overall assessment of the Pantex Plant safety management program and discusses safety management program effectiveness with respect to the three guiding principles. The ratings assigned to DP, AL, AAO, and M&H safety management program are presented at the end of this section.

The Pantex Plant has a vital, ongoing nuclear weapons mission and over the next few years faces a significant projected workload for weapons operations. The vast majority of work involves the stockpile maintenance and dismantlement mission; however, Pantex Plant also performs environmental restoration and research and development involving high explosives.

Oversight evaluated the existing safety management program, including appropriate interfaces with nuclear explosives safety. This evaluation looked at systems and processes to protect workers, the public, and the environment from such hazards as exposure to ionizing radiation and hazardous chemicals, releases of hazardous materials to the environment, and equipment and facilities that could cause injuries to workers. Oversight did not directly evaluate nuclear explosives safety as it relates to DOE Nuclear Explosives Safety/Surety Standards.<sup>5</sup> However, the interface between ES&H and these standards was reviewed.

### Overall Assessment

The Pantex Plant management is coping with decreasing budgets, expected downsizing and restructuring, aging facilities, and new requirements, all of which present a significant challenge to the safety management system. Local governments, community groups, and the public who live near and work at the site are particularly interested in operations at the Pantex Plant, both because of its importance to the local economy and because of the risks associated with hazardous

*Most of the Pantex Plant's work involves stockpile maintenance and dismantlement.*

*The Pantex Plant is maintaining an effective environment, safety, and health (ES&H) program in a changing environment.*

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<sup>5</sup>AL Supplemental Directive AL 5610.11A, Attachment 1, Chapter III.

materials. In 1991, M&H contracted with BMI to supply additional professional managers and staff to administer ES&H programs at the Pantex Plant.<sup>6</sup> Although not without some difficulties, AAO and M&H have been successful in maintaining an effective ES&H program and have effective processes for maintaining communication with the public, such as the Citizen's Advisory Board.

Safety management at the Pantex Plant is effective, and improvements continue to enhance the protection of workers, the public, and the environment. A significant safety improvement initiative is the Stockpile Stewardship for the 21st Century (SS-21) process (Figure 2), which has significantly improved the way worker hazards are analyzed and eliminated or controlled through design of weapons disassembly activities. This initiative was championed by AL and implemented by AAO and M&H. The application of the SS-21 process to weapons disassembly projects has resulted in safer and more efficient work practices. Overall, leadership within AAO and M&H has effected positive changes in the safety culture at the Pantex Plant. There has been an improvement in the safety culture over the last three to four years, with a demonstrated commitment to safety down through the organization from senior managers to the workers in the plant. Union activity at the plant is significant and is playing a vital role in providing for a safe work environment, and the degree of partnership and cooperation of the unions with AAO and M&H leadership is exceptional. With the mentoring resources and support of DP and AL, M&H's pursuit of DOE Voluntary Protection Program (VPP) Star status has served as a catalyst for worker enthusiasm and for the development of participatory and empowering processes such as the hazard identification teams, safe work awards program, and the Employee Concerns Program Review Committee. In 1994, AAO and M&H management exercised its authority and instituted a maintenance mode outage in production operations to address identified safety deficiencies associated with facility operations. This decisive action reinforced the site's policy that safety will not be compromised to meet production goals. Improvement is still needed to clarify roles, responsibilities, interfaces, and lines of authority between DP, AL, and AAO.

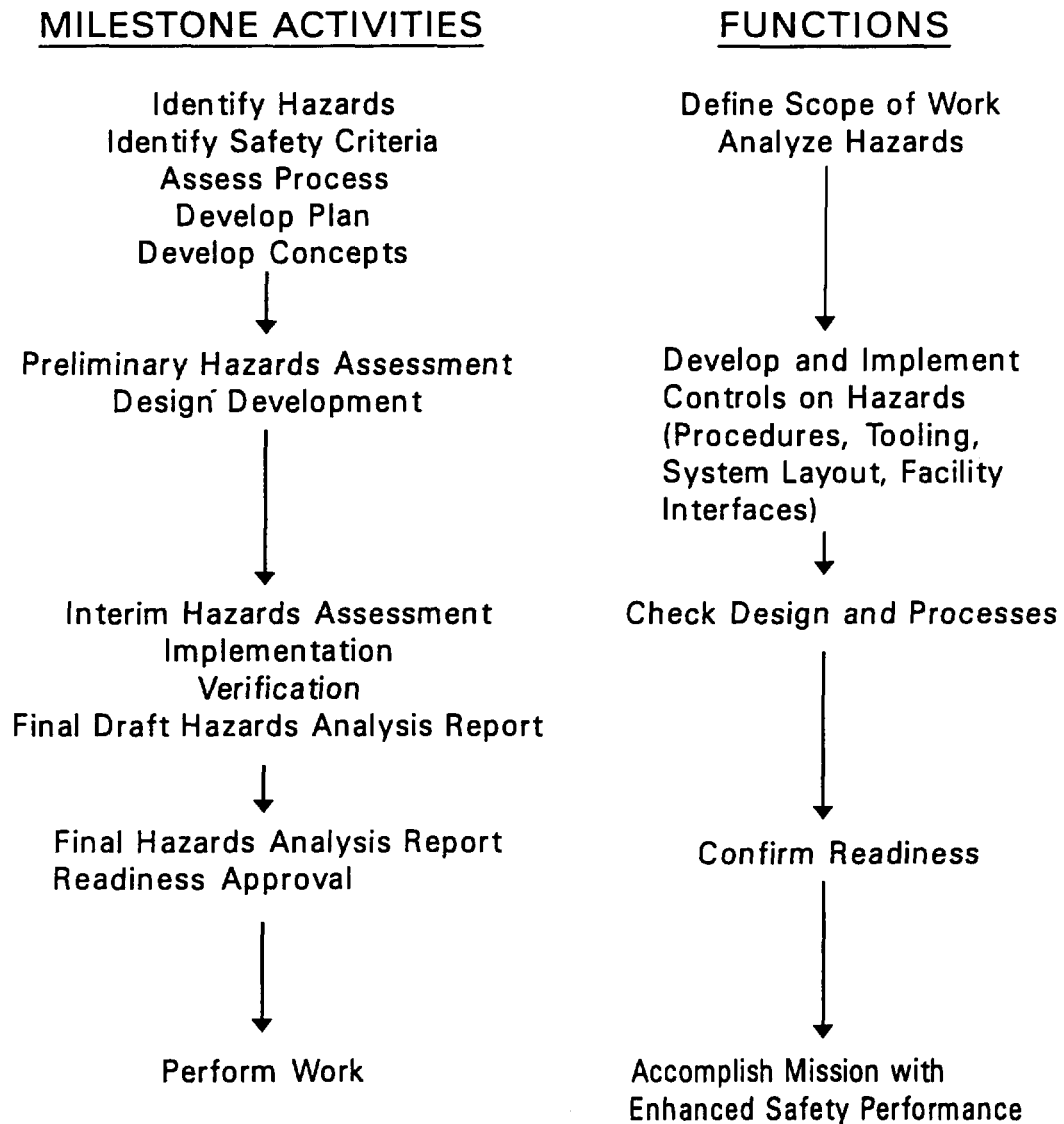
Pantex Plant management has made significant progress but has not yet achieved the objective of a standards-based approach to safety management. Hazard analysis and implementation of requirements are considered to have areas of effective performance and areas requiring improvement. With few exceptions, assessment programs within AL,

*The objective is to achieve a standards-based approach to safety management.*

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<sup>6</sup>M&H and BMI work closely together as a seamless organization. Throughout this report, Oversight refers simply to M&H, although it is recognized that many M&H activities are performed jointly by M&H and BMI.

# SS-21 PROCESS



Note: There is a hold point after each milestone to allow line management review.

Figure 2. The Stockpile Stewardship for the 21st Century (SS-21) Process

AAO, and M&H are considered to need overall improvement. Management is urged to pay particular attention to addressing the complete integration of ES&H and nuclear explosives safety, recurring procedural adherence problems, issues management systems, configuration management, and underlying factors that are hindering the development of standards/requirements identification documents (S/RIDs) and safety analysis reports (SARs).

DOE and M&H have recognized weaknesses in their employee concerns programs, and have taken a number of actions to strengthen these programs. Oversight interviews with a sample of the workforce indicated that the workers were confident of management's desire to resolve any reported safety concerns. A small number indicated that a few first-line supervisors continue to exert subtle pressure against raising any issues to higher authority.

AAO and M&H management have acknowledged that some previous employee safety concerns were not handled well, and they have taken corrective actions. Managers are aware of workers' perceptions and appear genuinely committed to addressing them. Oversight saw no evidence that management at AL, AAO, or M&H encouraged or tolerated retaliation against workers for raising safety concerns. Management will need to maintain emphasis on and continue to improve the employee concerns programs.

Overall, the Pantex Plant safety management system is effective. DOE and M&H management have positioned the Pantex Plant to attain the Department's goal of integrated safety management. Although there are weaknesses in some areas of safety management, most notably in the hazards analysis and assessment programs needed to ensure that comprehensive requirements are in place and executed, AAO and M&H managers have a good understanding of remaining weaknesses in the current systems and, in most cases, have appropriate plans to correct them. Further, there are a number of program strengths, such as a well trained and qualified workforce, that compensate for the identified deficiencies such that the overall safety management program is effective.

**Guiding Principle #1 - Line managers are responsible and accountable for safety.**

**Policy and Goals.** Pantex Plant policies, goals, and performance objectives are generally well defined and clearly communicated. There is a clear flowdown of DOE Headquarters policy and goals to specific M&H policy directives for various functional areas such as radiation protection. M&H policies, goals, strategies, and success factors are comprehensive, well-documented, clearly communicated, linked to organizational and individual performance evaluations, and consistent with DOE's policies, goals, and direction. AAO has also established

*Actions have been taken to strengthen employee concerns programs.*

*Strong workforce qualifications contribute to safety management program effectiveness.*

*The Amarillo Area Office (AAO) has established an effective policy framework that appropriately incorporates safety considerations.*

an effective framework of policies, goals, and objectives that appropriately incorporate safety considerations. AAO has not established subordinate implementation plans delineating tasks and activities for individual managers and staff to communicate expectations in support of the implementation of strategic goals. This has contributed to problem areas discussed elsewhere in this report: guidance and expectations in the development and review of SARs and S/RIDs, and issues management.

AAO has translated selected goals to specific performance objectives that are reflected in the M&H award fee evaluations. For example, a continuous improvement program for safety and health is one of AAO's goals; establishment of such a program was identified as a special emphasis area in the award fee pool. A specific performance measure was the establishment of the safe work award program (SWAP), which establishes financial incentives for employees if injuries are reduced. Similar performance objectives were established for reduction of waste generation rates and inventories of hazardous materials, resulting in improvement in these areas.

AAO and M&H have also been successful in strengthening relationships with stakeholders. Because of the nature of the activities at the Pantex Plant, its importance to the local economy, and local concerns over groundwater contamination, stakeholder interest and involvement in the Pantex Plant are significant. Pantex Plant has established a Citizens' Advisory Board to meet with senior Pantex Plant management to voice concerns and to gather information about ongoing Pantex Plant activities and plans. In an effort to foster open communication and community involvement, a member of the Citizens' Advisory Board participates in the Employee Concerns Program Review Committee.

Consistent with AL direction, AAO has developed a strategic plan, the AAO Operations Plan, that establishes specific goals, objectives, and priority activities for safety management. The Operations Plan is designed to provide direction, assist in prioritizing resources, and encourage forward-looking approaches to AAO activities over the next several years. For each core area, specific objectives, strategies, and success indicators are established to implement AL's strategic goals. These goals and objectives address AAO activities as well as site activities administered by M&H. Safety considerations are fully incorporated into these goals and objectives.

All elements of DOE's line management chain for Pantex Plant actively promote and champion certain ES&H initiatives. Improvement in safety has resulted from these initiatives. However, DP, AL, and AAO have not worked together effectively to establish priorities for various Departmental initiatives assigned to AAO for implementation. AAO has been tasked by DP and AL to participate in numerous initiatives, such as SS-21, conduct of operations improvements, SAR

*Specific performance objectives are reflected in award fee evaluations.*

*Stakeholder interest and involvement are significant.*

*Priorities for various Departmental initiatives have not been established.*

upgrades, S/RIDs, and enhanced work planning. The need to respond to these initiatives as well as operational occurrences has resulted in a less strategic and more reactive management approach within AAO. As a result, Pantex Plant line management is reacting to individual safety management program elements, rather than addressing activities within an overall framework that allows the establishment of a common set of strategic priorities toward integrated safety management.

**Roles and Responsibilities.** Pantex Plant personnel generally understand their responsibilities for effectively implementing ES&H programs. The Office of Facilities Operations (DP-24), AL, AAO, and M&H management have clearly established that safety is the primary line management responsibility at the Pantex Plant (see Figure 3). This clear and consistent message has resulted in a strong sense of ownership for safety among the line managers at all levels of the organization. Senior managers at the Pantex Plant have clear authority to enforce ES&H provisions.

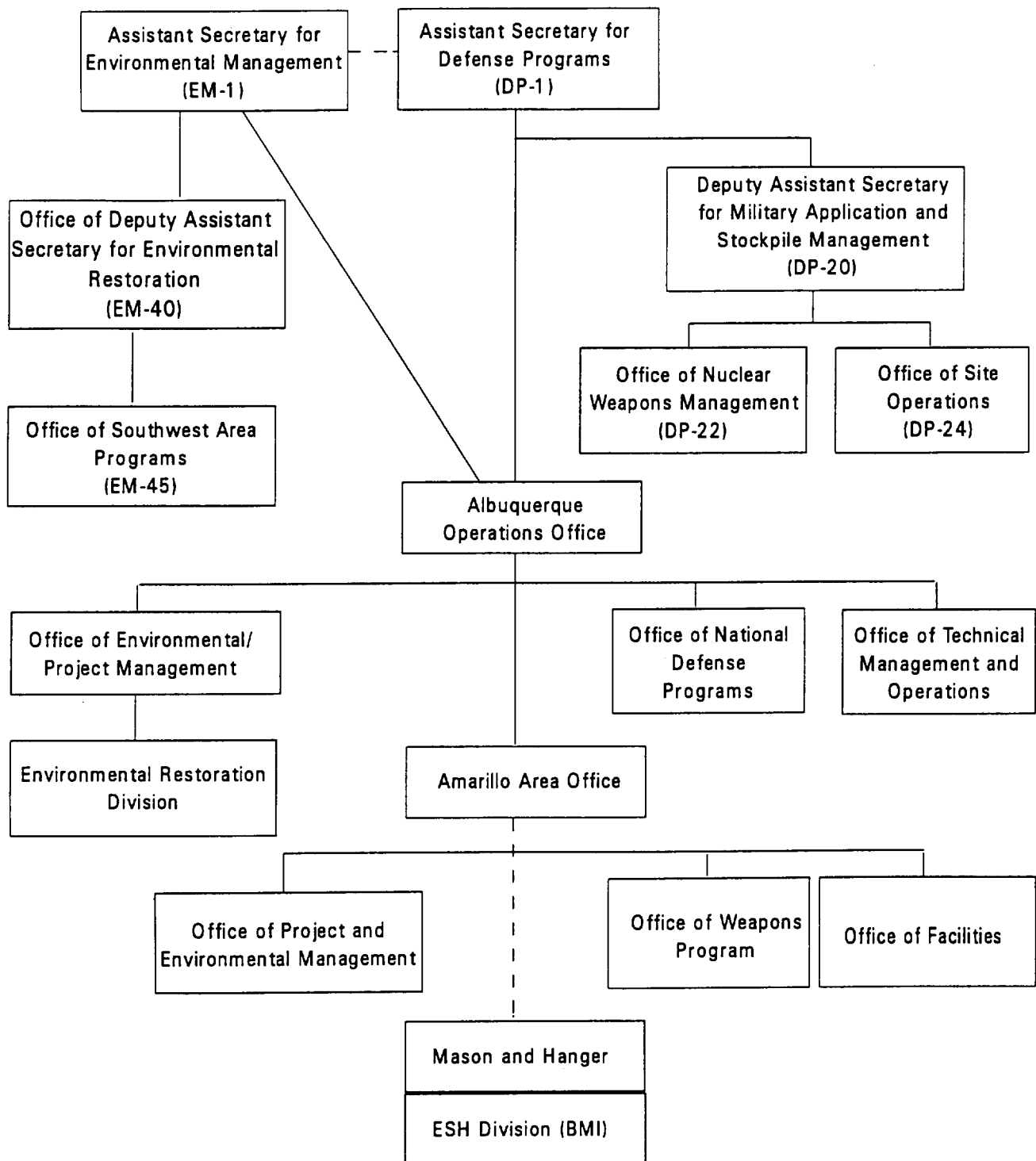
*Line managers show a strong sense of ownership for safety.*

The Deputy Assistant Secretary for Military Applications and Stockpile Management (DP-20), AL, and AAO each have an organizational entity that is responsible for the weapons program (including nuclear explosives safety) and a separate organizational entity that is responsible for facility operations, which includes other aspects of ES&H. At each level of DOE, both the weapons program and operations organizations recognize their responsibility for safety.

Although generally effective, some weaknesses were evident in roles and responsibilities. For example, the guidance issued by DP on SAR development was not effective in ensuring the execution of responsibilities for SAR review and approval. Contributing to this problem, DP staff did not effectively ensure that M&H incorporated DOE comments. This has resulted in delays in finalizing these safety documents.

Within AL, the Office of Technology Management and Operations (OTMO) is shifting its emphasis from oversight to ES&H support. Both OTMO and the AL Office of National Defense Programs have new responsibilities to improve integration of conventional ES&H considerations into weapons program activities. Some AL organizations have found the need to update their interfaces through letters of agreement and memoranda of understanding. The absence of a current Functions, Assignments and Responsibilities (FAR) Manual inhibits a clear understanding and communication of organizational responsibilities and authorities for safety management. AL has committed to the development of a FAR Manual in October 1996 to institutionalize the policy of integrated safety management. Further, AL Supplemental Directive 1120 (the document that formally defines

*The absence of a Manual of Functions, Assignments and Responsibilities inhibits safety management.*



**Figure 3. Line Management Responsibility**

the responsibilities and authorities of AL organizations) requires updating to fully define and communicate the current interfaces for ES&H responsibilities between AL organizations, including AAO.

AAO has established numerous organizational procedures to address implementation of their roles and responsibilities in meeting specific DOE requirements. Many of these procedures do not reflect current management expectations, and therefore some are being updated. The segmented nature of the defined responsibilities has resulted in a lack of a clear understanding of overall organizational responsibilities and authorities for managing safety programs. For example, further improvements in conduct of operations are being constrained by lack of full understanding of expectations, roles, and authorities by Facility Representatives.

A 1996 AAO management systems self-assessment, supported by DP-24, identified concerns regarding the ineffective communication of roles and responsibilities for AAO organizations. Recommended improvements are ongoing. The AAO manager issued a white paper in July 1996 to reinforce the role of AAO in the management of the Pantex Plant. The AAO weapons program has established protocols that describe the responsibilities of the weapons production operations. Team leads have further established the specific roles and responsibilities of team staff. The AAO Facility Representative team leader is revising the program manual to better define his organizational roles and authorities, consistent with AL Facility Representative program guidance and AAO management expectations.

ES&H roles, responsibilities, and authorities for M&H personnel are generally well defined, communicated, and understood by both ES&H personnel and line organizations. Individual responsibilities for safety are communicated to all M&H employees through formal measures, such as the Employee Manual. Additional measures, such as the ES&H self-study aid for managers and supervisors, have been taken to ensure that line management understands their responsibilities for ES&H.

**Project and Resource Management.** The Pantex Plant has the foundation for an effective project and resource management system, although the ability of senior management to identify and apply resources to emerging ES&H issues is limited. The risk-based ES&H planning and budgeting process has clear criteria for ranking risks and establishing common priorities between M&H and DOE. The process is generally effective in addressing recognized requirements and risks, and its use has supported improvements in core ES&H programs. Effective project management was noted in 1) design and construction of groundwater monitoring and remediation treatment systems; and 2) an enhanced work planning demonstration (using job hazards analysis on work planning) involving rail car decommissioning.

*Segmentation of responsibilities obscures understanding of safety program responsibilities and authorities.*

*Concerns identified by an AAO self-assessment are being addressed.*

*The risk-based process for ES&H planning and budgeting is effective.*

A weakness under this criterion is AL, AAO, and M&H management's ability to collect and analyze ES&H deficiency data to identify, prioritize, and resolve ES&H programmatic deficiencies. Some efforts have been successful in addressing programmatic issues. Still, to be fully effective, the project management system must provide a means for integrating feedback from an issues management system, which then will allow for adjustment and re-prioritization of ongoing efforts and implementation of new efforts based on newly defined risks. Pantex Plant has been generally effective in fixing discrete problems but has been less effective in resolving systemic and recurring problems, such as the recognized lack of knowledge of facility systems and operations by some M&H supervisors, and far-reaching issues such as workers' understanding of the SS-21 approach and philosophy.

Further complicating the application of an issues management system is the absence of effective information systems, making it difficult for AL, AAO, and M&H to identify the extent and scope of recurring problems, perform meaningful trend analysis, determine root causes, establish priorities, determine and fund corrective actions, track issues to closure, and verify effective implementation. Expectations for issues management have not been made clear by AL to AAO or by AAO to M&H. Such weaknesses have been recognized in a number of internal and external assessments over the past several years, and some actions are being undertaken by AL, AAO, and M&H. However, progress has been limited because line management has not taken the same degree of ownership and responsibility for sitewide issues as for those that are directly related to day-to-day activities. Strategies for addressing issues management problems have not been fully developed, coordinated, or implemented.

Effective processes for prioritizing issues and managing resources are particularly important at this juncture. To ensure that they meet all ES&H obligations, the Pantex Plant systems for managing projects and resources must be increasingly aggressive and innovative in identifying cost efficiencies. For example, addressing some of the issues associated with SAR review efforts, identified under Guiding Principle #2, may provide an opportunity to increase the efficiency of SAR development and thus facilitate completion and approval of the SARs. In addition, resources that are being spent on recurring tasks, such as walkdowns of critical safety systems and lockout analysis, would not be needed (or would not be needed as frequently) if an effective configuration management system were in place.

**Accountability for Performance.** DOE, as the "owner" of the site, is responsible and accountable for protecting the public, workers, and the environment from the inherent hazards associated with the weapons production mission. DP, EM (which is responsible for programmatic direction of environmental restoration and waste management activities at the Pantex Plant), AL, and AAO managers recognize that they are

*Resolution of systemic and recurring problems is less than effective.*

*Strategies for improving issues management have not been fully developed, coordinated, or implemented.*

*Managers recognize their responsibility and accountability for safety.*

responsible and accountable for safety. The Defense Nuclear Facilities Safety Board (DNFSB) and environmental regulators, such as the Texas Natural Resources Conservation Commission (TNRCC), actively evaluate DOE's performance in achieving nuclear facility safety and environmental compliance and restoration, respectively.

At AAO, some organizational goals and objectives have been defined, and safety-related performance is reported to be an informal factor in promotions and individual or group achievement awards. However, formal mechanisms to hold individual DOE organizational entities and individuals accountable require attention. For example, the performance of AL and AAO personnel assigned to champion specific objectives in their strategic plans is not measured in a meaningful way, and annual appraisal plans are vague with respect to safety and do not include environmental protection. The weaknesses in accountability systems have contributed to ineffective management and closure of AAO issues and ineffective adherence to administrative procedures (e.g. trending and analysis, management walkdowns).

Nevertheless, AL and AAO have effective measures to hold M&H accountable, most notably through contract incentives. The performance measures in the award fee pool are directly related to AAO policy and strategic objectives. In the past two years, ES&H measures have accounted for about 45 percent of the award fee pool, which provides a significant corporate financial incentive to perform effectively. Similarly, M&H has developed an effective mechanism to hold its ES&H subcontractor, BMI, accountable for performance (i.e., BMI's award fee is directly linked to the M&H cost plus award fee process score on ES&H-related issues). In addition, M&H has a process for establishing contractual provisions for subcontractor ES&H performance on a case-by-case basis.

M&H has an effective process for establishing division-specific goals, including measurable and quantitative goals for line and support organizations, and holding managers accountable for performance. Similarly, the M&H performance measurement system for individual managers, supervisors, and professional staff is well structured, measurable, appropriately focused on safety, and appropriately related to critical success factors. Accountability flows from the division managers to subordinate managers and then to the first-line supervisors and professional staff. An area for improvement would be that managers and staff need to be better held accountable for addressing assigned corrective actions and conducting required self-assessments.

Accountability of plant workers is reinforced through established policies described in the Employee Manual, and through SWAP. SWAP is intended to financially reward employees if site injury statistics are reduced. Further, due to the hazardous nature of work at Pantex Plant, disciplinary procedures for unsafe work have been

*Mechanisms for holding Departmental entities accountable require attention.*

*Contract incentives have been effective in holding the contractor, Mason & Hanger (M&H), accountable.*

*The M&H performance measurement system is appropriate and well focused on safety.*

*Disciplinary procedures for unsafe work have been established.*

established. Workers and managers who are involved in unsafe work practices can be and have, on a limited basis, been terminated.

Two M&H practices related to accountability for performance are especially noteworthy:

- First-line supervisors of employees who are injured on the job are required to personally brief the General Manager. This practice reinforces the accountability of supervisors for the safety of their employees.
- The Executive Safety Committee reviews all safety-related disciplinary actions, including those for managers and supervisors, for appropriateness in an open forum. This practice enables employees at all levels to observe management's commitment to hold employees, including managers, accountable for performance.

**Overall Assessment of Guiding Principle #1.** In summary, the Pantex Plant line management, which flows down from DP to AL to AAO and finally to M&H and its subcontractors, generally understands, accepts, and implements their responsibility for safety. AAO and M&H management has clearly articulated that safety will not be compromised to meet production goals and has demonstrated this commitment by acting decisively on a number of occasions to delay startup of new operations and respond to safety-related events.

AAO and M&H have also demonstrated their support for safety through programs such as the hazard identification teams and SWAP, establishment of clear ES&H policies and goals such as achieving VPP Star status, strong endorsement of the integrated safety management concept, and fostering more management presence in the facilities. In addition, AAO and M&H issued a statement supporting the integrated safety management concept embodied in the DOE response to DNFSB Recommendation 95-2, and have negotiated a contract revision specifying M&H's implementation of this effort. The pursuit of ES&H initiatives by all line management elements at the Pantex Plant has resulted in safer work practices and increased employee involvement. However, full and timely implementation of some important safety initiatives (e.g., SARs, S/RIDs) is being hampered by the lack of detailed strategies and clear expectations in DP, AL, and AAO.

AL and AAO effectively utilize contractual incentives to promote safety performance and improvements by M&H. M&H promotes achievement of ES&H goals by establishing measurable performance objectives for managers, supervisors, and professional staff. Formal mechanisms to hold DOE managers and staff accountable for safety management require attention.

*Overall, line management accountability for safety is appropriate.*

*Contract incentives are applied well.*

The foundation of a good risk-based prioritization system for ES&H projects has been established for the Pantex Plant, which has supported safety enhancements. To be more fully effective, improvements are needed to enhance management's ability to communicate information, analyze risk, prioritize corrective actions, and apply appropriate resources to resolve issues.

**Guiding Principle #2 - Comprehensive requirements exist, are appropriate, and are executed.**

**Requirements Management.** Systems are in place at AL, AAO, and M&H for identifying and implementing applicable DOE orders. AL is taking a conservative approach toward transferring to a streamlined set of DOE orders (i.e., orders numbered according to the three-digit system) while establishing clear traceability to current requirements (i.e., DOE orders numbered according to the four-digit system).

An informal process is followed to identify new external requirements applicable to Pantex Plant operations. M&H depends on ES&H professionals at Pantex Plant to provide timely identification and interpretation of new external requirements. The vulnerability in this approach is that changes in complex regulatory areas, such as environmental protection, may not be detected or interpreted properly. As an example, the system used for tracking environmental regulations has contributed to incomplete references to regulatory drivers in the Groundwater Protection Management Program Plan.

M&H has been generally effective in identifying requirements applicable to the Pantex Plant; however, requirements associated with specific work activities are not always clearly understood or documented. Requirements are often spread among multiple M&H procedures that are not well integrated and are hard to use. This creates difficulties in managing requirements.

There is an effective system for managing ES&H requirements applicable to subcontractors who perform environmental restoration, construction, and demolition activities at the Pantex Plant. M&H establishes generic requirements that subcontractors must address in detail in an integrated ES&H Plan. M&H reviews these ES&H Plans before giving approval to commence work. AAO and M&H conduct routine safety inspections to ensure that the specified requirements are properly implemented.

S/RIDs development is an important activity that will become a part of Pantex Plant's authorization basis when complete. Fully developing the S/RIDs, which will define the essential codes, standards, and requirements applicable to work activities at the Pantex Plant, can help address problems with the dispersion of requirements. This will also reinforce the Pantex Plant's transition to a standards-based culture by

*Resource prioritization could be enhanced.*

*Systems are in place at AL, AAO, and M&H for identifying and implementing applicable orders.*

*An informal process is followed to identify new external requirements.*

*There is an effective system to manage ES&H requirements applicable to subcontractors.*

*Preparation of standards/requirements identification documents (S/RIDs) will reinforce the transition to a standards-based culture.*

clarifying the specific requirements applicable to particular work activities.

AAO has taken a strong leadership position in working with M&H to develop a sound conceptual approach for the Pantex Plant S/RIDs. The concept for the Pantex Plant S/RIDs involves a fundamental change in approach to requirements management. As a result, there has been difficulty in developing a common understanding and acceptance of this initiative among all involved organizations (DP, AL, AAO, and M&H). The Pantex Plant approach for developing S/RIDs is valid; however, the initial submittal of performance objectives and criteria from M&H did not meet AL and AAO's expectations for a variety of reasons; for example, adequate links were not established between the actual work and hazards, and appropriate definitions of work activities were not developed. These problems can be attributed in part to M&H's lack of a clear understanding of specific expectations for the S/RIDs. An additional problem area is the lack of involvement and leadership by M&H line managers in the development of S/RIDs.

AAO is working with M&H, AL, and DP to clarify guidance and expectations for the sitewide S/RIDs. M&H is developing an implementation plan that will guide future S/RIDs development. M&H will initially develop S/RIDs one section at a time to demonstrate their understanding of the development process.

**Hazards Analysis.** Overall, the hazards associated with Pantex Plant operations are generally well understood and addressed. In most cases, hazards analyses provide the foundation for identifying appropriate requirements at the activity level and hazard mitigation actions. For nuclear facilities and nuclear explosives operations, DOE requires formal authorization basis documentation of hazards analyses and controls to provide an acceptable level of protection to the workers, the public, and the environment. The Pantex Plant authorization basis documentation is being upgraded through a more comprehensive and rigorous approach to hazards analysis. The interface between facility and nuclear explosives operations authorization bases is also being improved to ensure that all hazards are considered and appropriately analyzed. These efforts will ultimately result in enhanced safety and are a key element in the transition to a standards-based system at the Pantex Plant.

The interface between nuclear facilities and nuclear explosives operations had not been integrated historically. Nuclear explosives safety organizations were responsible for the safety of nuclear explosives operations, primarily from the perspective of preventing dispersal of special nuclear material in an accident. ES&H organizations were responsible for the safety of nuclear facilities and had little direct involvement in nuclear explosives operations conducted in the facilities. This resulted in a lack of focus on ES&H issues associated with nuclear explosives operations. Conversely, controls over critical safety

*There has been difficulty in developing a common understanding and acceptance of S/RIDs.*

*Hazards associated with Pantex Plant operations are generally well understood and addressed.*

*Historically, ES&H had not been integrated into nuclear explosives operations.*

systems that were essential to nuclear explosives safety were not always well established or maintained by facility management. Nuclear Explosives Safety Studies, while addressing the impact of these critical safety systems on nuclear explosives safety, did not address the system for assuring that the infrastructure was adequately maintained and controlled.

An initiative that has had a positive impact on the integration of ES&H into nuclear explosives operations is the SS-21 process.<sup>7</sup> The intent of SS-21 is to ensure that safety aspects of the weapons processes are considered up front, during the process development phase, not reviewed after completion. SS-21 integrates ES&H considerations into work planning associated with nuclear explosives operations by using M&H production technicians and ES&H personnel, along with weapons experts, on process teams that develop the procedures and training programs, define the facility interfaces, design the process layout, and establish the tooling requirements. The SS-21 process was piloted in the dismantlement of the B61 Mod 0 weapon and subsequently back-fitted into some aspects of W55 weapon dismantlement. Overall, the SS-21 process has been successful in improving safety. It also helped institutionalize conduct of operations principles in nuclear explosives operations and increased worker participation and empowerment related to safe operations.

Some areas of the SS-21 process could be improved. A more comprehensive and integrated approach to hazards analysis and a better interface with the SAR need to be established to ensure that all hazards to the worker are considered. Additionally, there needs to be more interaction between Pantex Plant personnel conducting the hazards analysis and M&H personnel conducting the work planning. Because M&H conducts the actual work, their ownership of and participation in the hazards analysis process is essential.

Active oversight by AL/AAO to ensure effective integration of ES&H into nuclear explosives operations is focused at the end of the SS-21 process rather than at the beginning. While contractor ES&H professionals have been involved in the SS-21 process, there has been little interaction with AL and AAO ES&H professionals during the development phases and milestone reviews. AL and AAO ES&H professionals must be actively involved during the SS-21 process to provide feedback on the technical adequacy of the hazards analyses and ensure proper integration with the SAR.

*The SS-21 initiative has had a positive impact on integrating ES&H with nuclear explosives operations.*

*AL and AAO ES&H professionals must be actively involved during the SS-21 process.*

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<sup>7</sup>SS-21 is the preferred process for developing weapons assembly and disassembly processes. The SS-21 process is defined in Interagency Engineering Procedure EP401110/B, Integrated Safety Process for Assembly and Disassembly of Nuclear Weapons.

Of particular importance in making the Pantex Plant authorization basis more effective is a strong interface between the hazards analyses associated with facility operations and the hazards analyses associated with nuclear explosives operations. The preparation of a hazards analysis report (HAR), similar conceptually to a SAR, is an authorization basis initiative to document hazards analyses and controls identified by the SS-21 process for nuclear explosives operations. Between the SAR and HAR, all hazards to the workers, the public, and the environment need to be considered and addressed. While the SAR is approved by Headquarters, the HAR is prepared by M&H, reviewed by AAO and AL, and approved by AL.

A pilot HAR is currently being prepared by the Los Alamos National Laboratory for the W69 dismantlement effort. As with the SAR upgrade program, specific expectations and technical guidance for HARs from DP and AL have not had sufficient detail. A draft standard has been provided to M&H; however, it is now being modified prior to being finalized. The AL Nuclear Safety Division, which has the lead for the ES&H review, indicated that early involvement of the HAR review experts is crucial and will be incorporated into all subsequent SS-21 projects. This early involvement should facilitate timely review and approval of future HAR submittals.

Upgraded SARs are being prepared to provide a detailed analysis of the hazards associated with work being performed at the Pantex Plant facilities. Until upgraded SARs are complete, facility operations are covered under a DOE-approved basis for interim operations (BIO) that meets the requirements of DOE Standard 3000.11. The Pantex Plant has also developed a Critical Safety System Manual (CSSM) as a stopgap measure for the lack of updated SARs. The BIO and CSSM are considered to provide an adequate level of safety and have been upgraded to include recent hazards analysis information. However, this documentation lacks fully developed hazards analyses and does not establish well defined safety requirements to define the facility safe operating envelope. Additionally, the BIO and CSSM do not provide a strong basis for maintaining control over facility configuration.

Although DOE Headquarters established the goal of upgraded SARs over four years ago, there has been limited progress. The primary problem with the SAR upgrade program has been that while DOE Headquarters established the requirement, DP and AL neither effectively monitored M&H's efforts nor resolved technical development issues. At the request of AAO, AL established a technical assistance team in the second half of 1994 to begin the technical review of upgraded SARs and provide feedback and guidance to M&H.

Even with the technical assistance team and established expectations for format and content, it took M&H six revisions to gain approval of the SAR module for the Pantex bays. Six revisions were required, partially due to inconsistent approaches by DOE reviewers at AAO,

*A stronger interface is needed between hazards analysis for facility operations and nuclear explosives operations.*

*Safety analysis reports for Pantex Plant facilities are being upgraded.*

*There has been limited progress in this effort.*

AL, and DP and partially due to M&H's inability to adequately resolve the technical issues that were raised. DP considers that the bays SAR module, which was approved in September 1996, can still be improved, but DP will allow this to be accomplished through the annual update process.

Technical deficiencies in M&H SAR products identified by DP included a lack of rigor and documentation of hazards analyses and poor definition of interfaces between operational activities and facility requirements. DP has taken the initiative to provide feedback through AL and AAO to M&H on their recent SAR submissions so that future inputs will meet their technical expectations. AAO is also working with M&H to revise the SAR upgrade implementation plan and improve SAR technical quality. DP anticipates approval of several SAR products over the next six months, which will significantly improve the quality of the approved Pantex Plant authorization basis.

Although DP, AL, and AAO are making significant progress in improving guidance and oversight of the SAR upgrade program, continued emphasis is necessary to ensure that M&H completes this initiative in a timely manner. M&H has not yet demonstrated complete understanding of SAR technical guidance from DP, AL, and AAO. Additionally, M&H does not have experience in developing technical safety requirements (TSRs), which will require a great deal of coordination across their organization. DP has also acknowledged that some critical definitions associated with the upgraded SARs still need to be established, as well as clear guidance and expectations for developing the TSRs.

**Implementation of Requirements.** During the Pantex Plant evaluation, the implementation of requirements was assessed in a number of areas, including radiation protection, industrial hygiene, industrial safety, explosives safety, conduct of operations, engineering/configuration management, process safety management, and groundwater protection. A number of initiatives at the Pantex Plant designed to improve the implementation of requirements were also assessed.

There has been progress in achieving effective implementation of requirements at the Pantex Plant. Improvements in the implementation of requirements have resulted in a safer working environment and can be attributed to increased management attention, improved worker involvement, and better work planning processes. Additional initiatives that are expected to improve implementation of requirements include full establishment of a configuration management system for facility critical safety systems; development of S/RIDs, which will provide clear expectations for the requirements; and completion of SARs and HARs with safety requirements that define the safe operating envelope.

*Steps are being taken to improve the process.*

*The Pantex Plant has made progress in effective implementation of requirements.*

The review of the implementing programs at the Pantex Plant revealed that there are programs in place to adequately protect workers, the public, and the environment. Industrial hygiene, industrial safety, process safety management, and groundwater protection were determined to be overall effective programs. Radiation protection, conduct of operations, engineering/configuration management, and explosives safety were determined to need improvements to be effective. For example, in the area of explosives safety, current weapons assembly/disassembly procedures result in longer-term exposure of workers to explosives than necessary, and service magazines are being inappropriately used for long-term explosives storage.

In a standards-based system of operations, procedures provide an important mechanism for effective implementation of the requirements necessary to protect the workers, the public, and the environment. Procedural quality and adherence issues continue to be problematic at the Pantex Plant and affect many implementing programs. Procedural quality issues are primarily associated with administrative procedures (operations, maintenance, and other activities not directly associated with nuclear explosives operations) because they are poorly integrated and hard to control and maintain. Critical-use procedures, which are used for nuclear explosives operations, are suitably integrated and controlled. While M&H has taken several actions to improve the quality of procedures, additional emphasis is needed to simplify and reduce the number of required procedures and provide necessary training for workers.

Procedural non-compliance issues have been the reason for approximately 50 occurrence reports for the first eight months of 1996. Observations made by the M&H Compliance Assurance Office and the AAO Facility Representatives also document procedural compliance issues. M&H has not been able to determine the underlying root cause(s) for continuing procedural problems, and thus has been unable to eliminate recurrence. A portion of the continued high levels of reported procedure violations may be attributable to increased reporting awareness.

Another problematic area at the Pantex Plant that contributes to implementation issues and cuts across many programs is configuration management. While improvements have been made in configuration management since the 1994 maintenance mode outage, the low priority assigned by AL and AAO has resulted in the program being less than useful. Deficiencies in the configuration management system include: (1) a lack of piping and instrumentation drawings; (2) a limited number of completed engineering system drawings; and (3) inadequate equipment component labeling for critical safety systems. It is important to maintain configuration management and system status control in facilities that perform nuclear explosives operations. Additionally, moving to a formal configuration management program could increase cost effectiveness by reducing walkdowns and rework,

*Procedure quality and adherence issues continue to be problematic.*

*Configuration management also requires attention.*

and will reduce the probability of introducing errors into safe work activities.

**Assessment Programs.** A number of AL, AAO, and M&H assessment efforts under way at the Pantex Plant have various levels of effectiveness and provide line management with a general understanding of the status of programs and various work activities. The lack of rigor and detail in analysis efforts contributes to a lack of understanding of the underlying problems or root causes. Without this information, it is very difficult to develop and implement effective corrective actions and resolve issues.

Neither AL nor AAO has a functional self-assessment program. AAO had initiated an effort to use a team of outside consultants to establish methodologies and assist AAO staff in developing a self-assessment program. However, this effort was canceled, and there are no plans within AAO for reestablishing a self-assessment program. AL does not have a self-assessment activity that requires organizations to review themselves critically.

One of AAO's primary responsibilities is to assess M&H's performance. This is accomplished through daily reviews of M&H activities, some programmatic reviews (e.g., radiation protection, explosives safety, and environmental protection), and "for cause" assessments. Another key element of the AL and AAO assessment program is the shadowing of M&H internal independent assessment activities. AAO has a flexible approach to these assessment activities in order to focus on emerging problem areas. While this approach is beneficial in overseeing the contractor on a daily basis, it results in a lack of an independent and integrated strategic perspective.

AAO uses Facility Representatives to review the daily conduct of contractor operations and subject matter experts to review implementing programs on a routine basis. DP and AL provide technical assistance to AAO by providing subject matter expertise when requested. AL is also planning to institute a joint AL/AAO annual multidisciplinary appraisal of M&H, with DP participation.

Daily operational information is gathered by Facility Representatives and provided to senior management without the benefit of full analysis. Because of the large amount of unanalyzed information they have to review, senior AAO managers have not been able to develop a strategic perspective to separate important or systemic issues from those that are not as important. Issues are not addressed in a structured manner, but receive attention on a crisis basis. In this situation, the skills and expertise of Facility Representatives are not being fully utilized. Additionally, management has not required Facility Representatives to work proactively with AL and AAO subject matter experts to identify programmatic issues. Combining daily operational

*Assessment programs have not provided an understanding of site-wide issues and root causes.*

*AAO has a flexible approach to assessments but lacks a strategic perspective.*

*Issues are not addressed in a structured manner.*

information with programmatic issues is an important activity in determining the full impact of emerging issues.

Within AAO, one of the management tools used to track various assessment activities is the Field Activities Data Base, which was established to allow AAO to combine findings from Facility Representative observations, management walk-throughs, "for cause" assessments, and findings from external assessment programs. This system is only a database; it has no prioritization scheme for the issues and associated corrective action plans, and it is not universally available to the AAO staff because of equipment incompatibility. As a result, information necessary for AAO managers to assess and integrate findings from the variety of assessments and other inputs is not readily available. This also prevents AAO managers from utilizing a strategic approach to issue management at the Pantex Plant, as discussed under Guiding Principle #1.

The M&H strategy for assessing performance consists of two elements: (1) an internal, independent assessment program; and (2) a self-assessment program individually implemented by each organizational segment. The M&H independent assessment program, performed by the Compliance Assurance Office, has been effective in identifying significant areas for line management improvement. The internal, independent assessment program has provided valuable information to the organizational elements being assessed; however, it is not clear that senior management is using this information to establish sitewide priorities.

The M&H self-assessment program is relatively informal. A result is that the programmatic perspective and rigor of these activities varies widely. Less than 25 percent of the M&H self-assessment activities reviewed were identified as providing meaningful, management-level feedback to the organization that conducted them. Many of the self-assessments consisted only of checklist reviews, with no accompanying analysis or identification of programmatic issues.

Issues requiring M&H management attention come from a variety of sources, including the independent assessment program, self-assessments, occurrence reports, DOE line management assessments, and other groups internal and external to DOE. These issues are not integrated or managed to allow senior management to focus on prioritization across the organization. Additionally, the issues are not analyzed to identify the extent and scope of recurring problems, or underlying root causes. There are numerous findings and corrective action tracking systems; these are fragmented and not cannot track sitewide issues. As a result, senior management has a limited ability to strategically allocate resources to resolve sitewide issues. M&H has identified this deficiency, but AAO has not reviewed or accepted the proposed corrective action plan.

*Information necessary for AAO to assess and integrate findings is not readily available.*

*The M&H internal, independent assessment program has provided valuable information.*

*M&H has a limited ability to strategically resolve sitewide issues.*

**Overall Assessment of Guiding Principle #2.** The systems for establishing, implementing, and executing requirements at the Pantex Plant are in the midst of a significant transition. Most fundamentally, Pantex Plant management has recognized that its longstanding reliance on the experience of individuals (expert-based system) must be replaced with an approach that relies on comprehensive standards, detailed work planning, careful hazards identification and control, and stringent conduct of operations (standards-based system).

This change is being institutionalized through such initiatives as developing S/RIDs, upgrading SARs, developing HARs, using the SS-21 process, and fully implementing configuration management. The most notable positive impact has resulted from application of the SS-21 process. The other initiatives have also had positive impacts; however, the benefits will not be fully realized until implementation is complete.

Requirements management activities at the Pantex Plant have been significant in terms of effort, but have not resulted in an environment that supports consistent compliance with requirements. Additional formality is needed to ensure that internal and particularly external requirements are accurately and completely integrated into the Pantex Plant requirements management system.

While there has been progress in achieving effective implementation of requirements through many of the initiatives, additional improvements are necessary in a number of areas. Procedure quality and adherence continue to be problematic and require management attention. Additionally, the low priority assigned to configuration management has resulted in the program not being effectively implemented.

DOE Headquarters established the goal of upgraded SARs over four years ago. Initially, DP and AL did not effectively monitor or provide guidance on this initiative. DP, AL, and AAO have made progress in improving guidance and oversight of the SAR upgrade program. Continued emphasis is necessary to ensure that M&H carries this initiative through to timely completion. The DP, AL, and AAO initiative to better integrate ES&H into nuclear explosives operations has been successful in making Pantex Plant weapon dismantlement activities safer. SS-21 has been the primary driver for improvement. However, enhancements are required in hazards analysis activities to ensure that all ES&H concerns are addressed in the HAR and/or the SAR.

Assessment programs require significant improvement to provide management with summary information they can readily act upon and use to set priorities. A number of AAO/AL and M&H assessment efforts are under way that have various levels of effectiveness and provide line management with a general understanding of the status of

*Systems for establishing, implementing, and executing requirements are in transition at the Pantex Plant.*

*Changes are being institutionalized through standards-based initiatives.*

*Improvements are needed in procedure quality and adherence.*

*Continued emphasis is needed for safety analysis report upgrades.*

*Assessment programs require significant improvement.*

programs and various work activities. Tracking, trending, analysis, and management of issues are not effective in providing AL/AAO and M&H with an integrated sitewide perspective on important ES&H issues.

In summary, AAO and M&H management have made significant progress, but have not yet achieved their objective of a standards-based approach to safety management at the Pantex Plant.

**Guiding Principle #3 - Competence is commensurate with responsibilities.**

**Staffing and Qualifications.** Over the past three years, the competence of the Pantex Plant workforce has been significantly improved by a variety of AAO and M&H initiatives. Most notably, the number of ES&H professionals at M&H has increased from 140 to over 350. These new personnel bring experience in government, military, industry, and commercial safety and nuclear programs that complements the experienced and relatively stable workforce at the Pantex Plant. The AAO Manager, with support from AL and DP, has also made a substantial commitment to improving the technical and managerial qualifications of the AAO staff, who can now direct, and challenge as necessary, the M&H decisions and initiatives. It appears that sufficient AAO staff with appropriate qualifications are available to manage current and projected workloads. Recognizing that M&H staffing will be adjusted to match outyear production forecasts, AAO and M&H have developed a strategic approach to restructuring that considers workload projections, hiring controls, skills matching, internal transfers, and training opportunities.

**Technical Competence and Knowledge of Hazards.** AAO and M&H managers and professional staff exhibit sufficient technical competence to effectively and safely manage the weapons mission. AAO managers and professional staff demonstrate a high degree of technical competence, practical experience, and good understanding of weapons safety and operations. The AAO managers are knowledgeable about the hazards associated with Pantex Plant operations. Overall, the competence of Facility Representatives is appropriate, and all are expected to complete their qualifications by December 1996.

M&H managers, technical staff, and engineers have the appropriate educational background, technical knowledge, and site-specific experience for their job assignments. These individuals have good credentials, are capable of performing rigorous technical evaluations and managing complex projects, and have a clear understanding of hazards at their facilities. Qualifications for union craft workers are also appropriate. Most individuals interviewed, including managers, engineers, union workers, and other staff, expressed an appropriate level of awareness of health and safety issues and the potential hazards of their facilities.

*Sufficient qualified staff are available.*

*Managers and professional staff are competent and understand facility hazards.*

**Worker Participation and Empowerment.** Since 1994, the increased emphasis on worker participation and empowerment has resulted in motivating individual and team safety performance. Programs that foster worker input and trust include the HIT teams, the Electrical Safety Committee, and the Joint Labor/Management Safety and Health Committee. Monetary incentives have been established for safety accomplishments by the M&H workforce. These include SWAP and a \$100 Spot Award. Programs such as SS-21, the enhanced work planning pilot, and use of job safety and health analyses for specific tasks have benefitted from workers applying their skills and knowledge of hazards to the analysis and design of job procedures.

*Emphasis on worker participation has motivated safety performance.*

Workers have many avenues for voicing ES&H concerns. These include union stewards and union safety officers, an M&H ES&H hotline, and a hierarchy of VPP-based safety committees. To establish pathways where anonymity or confidentiality can be maintained, AAO, AL, and M&H employee concerns programs were established in 1994 and 1995. Initially, program effectiveness suffered because of organizational shortcomings and program scope. AAO and M&H management have recognized these shortcomings and have completed corrective actions.

*Workers have many avenues for voicing ES&H concerns.*

There have been past instances where weapons assembly and disassembly workers, upon raising safety questions, found first-level supervisors to be insensitive when challenged about what they consider "tried-and-true" or "officially approved" weapons disassembly procedures and safety bases. M&H management has recognized the problem created by this "old way of thinking." It is clearly M&H policy that workers' concerns be addressed and that there will be no reprisal for coming forward. The company has undertaken initiatives to educate supervisors and managers on this policy: training in personnel sensitivity, conflict resolution, and effective leadership; and counseling by an expert consultant on employee concerns. Most importantly, where concerns are verified as having merit, action has been taken to change processes or procedures to address concerns and mitigate hazards.

*M&H fully supports workers' right to express concerns freely, though some supervisors are not always sensitive to worker participation.*

Associated with the "old way of thinking" that put production over safety, some workers, in responding to a M&H survey conducted in August 1996, have expressed fears that they may suffer retaliation for raising an ES&H concern. The underlying reasons for this perception are complex. To some degree, it may be attributed to the spread of stories from person to person, or from supervisor statements such as "we want to keep our problems in the department." Two additional factors include normal apprehensions that arise during expected periods of downsizing, and peer pressure from fellow workers concerned over possible loss of work hours and overtime pay resulting from possible slowdowns while concerns are resolved. Management very strongly supports workers' right to raise concerns without fear of retribution,

and no current examples of employee retaliation were uncovered during this assessment.

Pantex Plant workers believe, and the Oversight evaluation team has found, that there is a safe work environment at the plant. Programs established under VPP have added more pathways for worker involvement and participation and are engendering a sense of worker ownership and trust. Eliminating the fear and concern associated with actual or perceived historical cases of retaliation for raising safety issues will take time and continuing and aggressive management communication, training, and assurance to the Pantex employees. It is not unusual for worker acceptance and confidence to lag behind significant improvements in employee concerns programs, a phenomenon that has been observed at other DOE sites. Employee confidence in the M&H policy and employee concerns program will increase with time, but only if management remains vigilant to ensure that valid employee safety concerns are resolved fairly and promptly.

**Training.** The DOE training organization is composed of the AL Qualification and Training Branch and a training officer at AAO. The AL office has programmatic responsibility for Federal employee training and oversight of contractor and AAO training programs, whereas AAO has responsibility for implementing training policies and procedures mandated by AL and for daily oversight of M&H training programs. Policies and division of responsibilities between AL and AAO have been clearly defined through procedures. Overall, the AAO training and qualification program meets the requirements of DOE Order 360.1, "Training," and is well documented.

*The training programs are well documented and meet requirements.*

AL and AAO have been effective in identifying, locating, and procuring training for Federal employees and in monitoring, evaluating, and driving change within M&H training programs. However, improvements in documenting resolution and closure of training issues are needed to facilitate proper followup and trending of the adequacy of corrective actions.

*Closure of training issues could be better documented.*

The M&H training organization provides most training services needed by AAO, unions, and M&H personnel. AAO and M&H training is performance-based and is developed using the systematic approach to training model. The effectiveness of the M&H training organization has been steadily improving as line management and workers become more involved in and committed to the training process. The program fosters a safety conscious and knowledgeable work force. Weaknesses were noted in radiological worker and technician training and is partially attributable to inadequate practical training exercises. More comprehensive exercises need to be developed to challenge worker knowledge. A strategic approach for defining, developing, and implementing training on a sitewide basis was evident, ensuring that the quality of training is consistent.

**Overall Assessment of Guiding Principle #3.** Over the past three years, the competence of the Pantex Plant workforce has been significantly improved by a variety of AAO and M&H initiatives, which have been supported by AL and DP. This improvement is most notable in the M&H ES&H arena. New personnel have brought experience in government, military, industry, and commercial safety and nuclear programs that complements the experienced and relatively stable workforce at the Pantex Plant. The AAO Manager has also made a substantial commitment to improving the technical and managerial qualifications of the AAO staff. For the past three years, one of his primary goals has been to obtain technical and managerial staff who are technical peers of the contractors. This goal has been met; a Senior Technical Advisor has been added, and Assistant Area Managers and their staff now possess the backgrounds and technical capability to direct, and challenge as necessary, M&H decisions and initiatives.

AAO and M&H have been faced with the significant challenge of changing the work culture from one that stressed production to one that recognizes the importance of safety. Although not without difficulty, AAO and M&H have been successful in managing this change; workers realize that while production is important to national defense, their safety has appropriate priority. There has also been increased emphasis on worker participation and empowerment, resulting in improved safety performance. Union leadership has integrated the needs and concerns of their membership with the national defense mission, resulting in outstanding cooperation with AAO and M&H management, and significantly contributing to plant safety.

Collectively, DP, AL, AAO, M&H, and subcontractor personnel responsible for safety management at the Pantex Plant demonstrate competence appropriate to their ES&H responsibilities. The Pantex Plant management has effectively implemented all four criteria under this principle (staffing and qualifications, technical competence and knowledge of hazards, worker participation and empowerment, and training).

In summary, Pantex Plant personnel have the qualifications, training, and knowledge of hazards to perform their safety management responsibilities. The commitment to obtaining and maintaining a qualified work force is evident from the highest levels of management. Continued and sustained attention is needed to ensure that a culture where safety and production are appropriately balanced is fully realized and to address residual concerns about retaliation for raising safety issues.

### **Ratings**

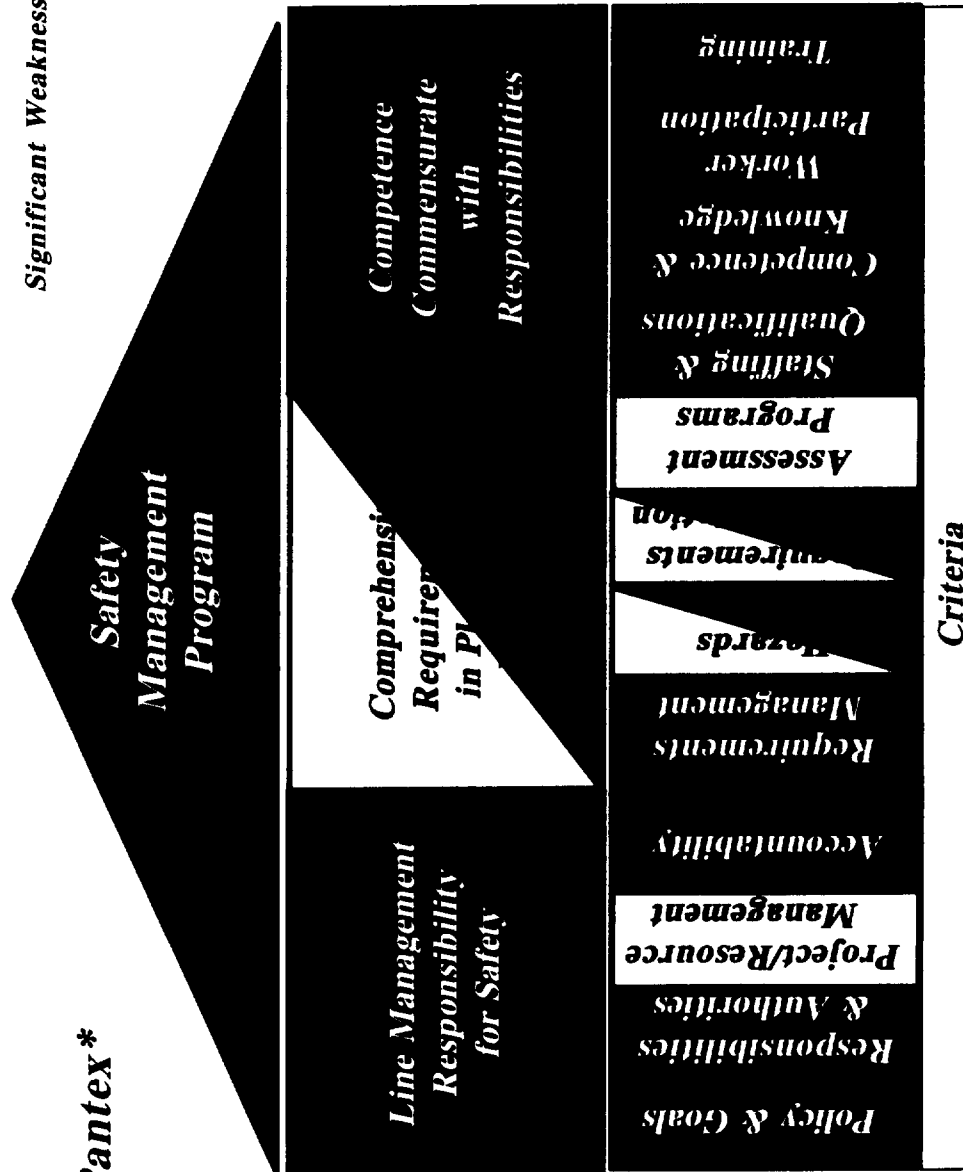
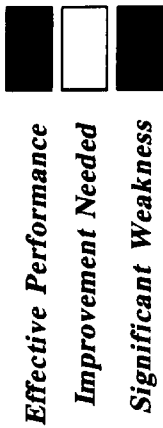
The ratings for the twelve criteria, three principles, and overall Pantex Plant safety management program are shown in Figure 4.

*Recent initiatives have significantly improved the competence of the workforce.*

*Workers realize that their safety has appropriate priority.*

*The change to a culture where safety and production are balanced requires continued attention for sustained success.*

# Summary Ratings



\*These ratings reflect the evaluation of safety management for the DOE and contractor line organization: DP, AL, AAO, and M&H

Figure 4. Summary Ratings for Pantex

### 3.0 OPPORTUNITIES FOR IMPROVEMENT

The safety management evaluation conducted by EH identified several opportunities for improvement in safety management, based on an analysis of the strengths and weaknesses identified during the evaluation of the Pantex Plant. These are summarized in Table 2. Opportunities for improvement, which are not prescriptive, may contribute to the success of the integrated safety management program.

**Table 2. Opportunities for Improvement**

- |   |
|---|
| <ol style="list-style-type: none"><li>1. Enhance communication, coordination, and cooperation among DP, AL, AAO, and contractors by clarifying roles, responsibilities, interfaces, and lines of authority.</li><li>2. Develop integrated strategies and procedures that enable DOE senior managers to direct and measure the effectiveness of various ongoing ES&amp;H initiatives.</li><li>3. Increase organizational and individual accountability within DOE.</li><li>4. Develop and implement management systems that provide information on ES&amp;H performance and that assist management in the identification and resolution of programmatic ES&amp;H issues.</li><li>5. Strengthen commitment to transition from "expert-based" to "standards-based" system of operation.</li><li>6. Clarify DP, AL, AAO, and M&amp;H interfaces to further enhance integration of ES&amp;H into nuclear explosives operations.</li><li>7. Improve visibility of AAO's, and acceptance of M&amp;H's, employee concerns programs.</li></ol> |
|---|

1. Enhance communications, coordination, and cooperation among DP, AL, AAO, and contractor management by clarifying roles, responsibilities, interfaces, and lines of authority.

#### **Background**

Integrated safety management is most successfully implemented when all individuals within involved organizations understand clearly what is expected of them and what support they can reliably anticipate from others. Communication of such expectations throughout the management chains for Pantex Plant has not always been comprehensive, consistent, or formally documented. Poor communication has led to lack of clarity in roles, responsibilities, and authorities, which in turn has resulted in some observed weaknesses in effectively addressing the root causes of operational events and unnecessary delays in safety improvements.

### **Potential Actions**

- Evaluate, in a cooperative effort involving both DP and AL, the existing or changing roles, responsibilities, interfaces, and lines of authority within DP, AL, and AAO intended to provide operational and program directions to the contractors. Roles and responsibilities should reflect a shared ownership of the goals and should result in consistent and timely direction to contractor organizations. Roles, responsibilities, and authorities should be clearly articulated, documented, and communicated throughout the DOE organizations and the contractors.
  - AAO should reevaluate the existing roles, responsibilities, interfaces, and lines of authority of both AL and AAO organizations to identify and correct inconsistencies and ambiguities. Further, they should ensure that clearly defined roles, responsibilities, and authorities are an integral part of initial planning for new safety management initiatives.
  - Reevaluate ES&H work processes, such as the review and approval of safety documents, to assure effective capture of defined roles, responsibilities, and authorities for each line organization.
2. **Develop integrated implementation strategies and procedures that enable DOE senior managers to direct and measure the effectiveness of the various ongoing ES&H initiatives.**

### **Background**

The Pantex Plant has many ES&H initiatives in various stages of development and implementation. Efficient and effective management of these initiatives is essential in addressing interim or compensatory measures of safety, in timely completion and integration of resulting programs, and in ensuring that responsible personnel are involved and take ownership of the end product. Several weaknesses were observed in this area: implementation milestones are often extended, resulting in customers' development and pursuit of alternate processes and controls; new events detract attention; and the final product is no longer universally accepted and applied as "the site's approach" for implementing integrated safety management.

### **Potential Actions**

- Direct monitoring and assessment activities for AAO and M&H toward assuring effective implementation of initiatives.

**3. Increase organizational and individual accountability for ES&H performance within DOE.**

**Background**

The performance appraisal process used for ES&H does not effectively establish individual accountability for AL and AAO personnel.

**Potential Actions**

- Modify or supplement existing personnel performance measures for both AL and AAO to clearly tie them to improving safety performance and implementing safety initiatives.
- Consider developing subordinate annual plans within the AAO organizations that establish work tasks in support of their Annual Operation Plans.

**4. Develop and implement management systems that provide information on ES&H performance and that assist management in identifying and resolving programmatic ES&H issues.**

**Background**

Effective management of ES&H issues requires that line management at all levels has readily available, appropriate, and usable information regarding the overall level of performance and the status of corrective actions addressing those issues. Reliance on periodic performance metric reporting will not provide adequate information for managers to make informed decisions regarding ES&H. Line managers responsible for ES&H at the Pantex Plant, from subcontractors through DP, do not have easy access to the additional information needed to make timely and informed decisions for resolving issues that are adversely affecting safety performance. Available information from such sources as assessments and events and resulting corrective actions is fragmented, is often informal, and is not in a form that can be analyzed to identify and prioritize known deficiencies and issues and help management drive resource allocation and the development and monitoring of effective solutions.

**Potential Actions**

- Evaluate, strengthen, and coordinate the various AL, AAO, and contractor assessment programs and processes (e.g., management assessments, quality assurance audits and surveillances, self-assessments, and DOE surveillances and assessments) into a comprehensive program that ensures

appropriate and timely evaluation of all organizations, facilities, management systems, and functional areas.

- Strengthen and institutionalize DOE and contractor self-assessment processes through a rigorous, *programmatic* approach within organizations at all levels.
  - Improve AAO surveillance processes for both Facility Representatives and subject matter experts by improving the formality and structure of the program, enhancing root cause analysis skills, and improving timeliness and thoroughness of documentation.
  - Establish integrated corrective action management programs for the Pantex Plant to ensure that ES&H deficiencies are documented, prioritized based on risk, assigned to managers with authority for corrective action, evaluated for extent of condition and root causes, corrected, and tracked to closure. These programs should:
    - Capture findings from all internal and external assessment activities, events, employee concerns, accidents and near misses.
    - Collect deficiencies and corrective actions for tracking, analysis, trending, and reporting to line managers, including action due dates, responsible managers and organizations, processes for escalating overdue corrective actions to appropriate levels of management, and assuring documentation of resolution and closure.
    - Involve a sitewide prioritization process for addressing identified deficiencies, findings, and issues to assure adequate consideration of risks to the public, workers, and the environment.
    - Analyze identified items for adverse trends, lessons learned, and systemic issues and communicate findings to the appropriate levels of management.
    - Provide for DOE and contractor management followup of corrective actions to provide continuous periodic verification of the effectiveness of the corrective action program.
5. **Strengthen the DP, AL, AAO, and M&H management commitment to transition from an "expert-based" to a "standards-based" system of operation.**

## **Background**

The Pantex Plant has not yet achieved the transition to a standards-based system of operation. Several DP, AL, AAO, and M&H initiatives need to be fully implemented to have the overall positive impact that is desired. Additionally, other management systems that support the technical infrastructure at the Pantex Plant (i.e., configuration management and procedures development) need significant improvement to support the standards-based system of operation.

## **Potential Actions**

- Increase AL and AAO subject matter expert involvement in the S/RIDs process to monitor quality of development efforts. Provide timely DOE review of M&H S/RIDs submissions.
- Increase DP, AL, and AAO coordination on SAR technical issues to: 1) provide M&H with consistent and detailed technical feedback on rejected SAR upgrade submissions; 2) establish clear expectations for future revisions; 3) hold M&H accountable for developing quality SAR products; 4) provide timely review of future SAR upgrade submissions; and 5) establish a new implementation plan that will result in aggressive completion of SAR upgrade initiative.
- Establish clear DP, AL, and AAO expectations on format and content of the HAR and provide technical guidance to ensure M&H understanding. Increase involvement of the AL Nuclear Safety Division and AAO in overseeing M&H HAR development activities.
- Prioritize the establishment of a configuration management system that will provide piping and instrumentation drawings, completed system controlled documents, and equipment component labeling for critical safety systems.
- Define clear guidance and expectations for future S/RIDs development efforts. Clarify the technical definition of work activities and establish traceability of requirements between work and hazards. Develop a program plan that establishes aggressive and realistic milestones and clarifies the roles and responsibilities of AL, AAO, and M&H personnel involved in development, review, and approval activities.
- Improve the effectiveness of procedures in implementing requirements. Reduce the number of administrative procedures by leveraging the S/RIDs process. Improve the procedure development process through a centralized approach that enhances integration and coordination.

- Formalize the system to identify, analyze, distribute, and incorporate external requirements, particularly environmental regulations.
6. Clarify DP, AL, AAO, and M&H organizational interfaces to further enhance integration of ES&H into nuclear explosives operations.

#### **Background**

Historically, ES&H had not been integrated into nuclear explosives operations at the Pantex Plant. In the past several years, DP, AL, AAO, and M&H have worked to strengthen ES&H integration in nuclear explosives operations and better define the interface with nuclear facilities, including the SS-21 and HAR initiatives. Integration can be further enhanced through improvements in processes, organizational interfaces, and the understanding of roles, responsibilities, and authorities.

#### **Potential Actions**

- Articulate a DP, AL, and AAO vision that establishes: 1) more effective organizational integration of ES&H and nuclear explosives safety functions; 2) clear roles and responsibilities of DOE ES&H organizations; and 3) enhanced processes to sustain and improve integration of ES&H into nuclear explosives operations.
- Strengthen SS-21 hazard analysis activities to ensure that all ES&H hazards are adequately analyzed and addressed. ES&H experts should be included as members of the Hazard Analysis Process Team. Additionally, increase the involvement of AL and AAO ES&H subject matter experts in SS-21 milestone reviews to ensure that ES&H hazards are appropriately identified and analyzed and that there is a seamless interface with facility hazards analyses.
- Establish M&H ownership of SS-21 hazards analysis processes to better integrate hazards analysis with work planning activities and to improve M&H preparation and review activities associated with HAR development.
- Strengthen the interface between HARs and SARs to ensure that between these two authorization basis components, all hazards are adequately analyzed and addressed and that a consistent set of safety requirements is in place to form a safe operating envelope.

**7. Improve the visibility of AAO's, and acceptance of M&H's employee concerns programs.**

**Background**

The M&H Employee Concerns Program was established in April 1995. Program effectiveness suffered initially due to program organizational structure and scope. The AAO Employee Concerns Program, which was established earlier in 1994, has had a small number of complainants. While information about the DOE program has been provided on posters and in general employee training, interviews with M&H employees indicated that few were aware of the DOE program. M&H and AAO management recognized the need for dedicated ECP managers and have established and filled such positions. There are a number of opportunities to add to the credibility and acceptance of these programs by Pantex employees with safety-related concerns.

**Potential Actions**

- Improve the AAO and M&H employee concerns programs to increase acceptance by M&H workers through increased publicity to the M&H plant population about the DOE concerns pathway.
- Most importantly, limit the scope of the employee concerns program to those ES&H and associated issues specified in DOE Order 5480.29. Channel concerns regarding other subjects, such as equal employment opportunity, sexual harassment, and discrimination, to other already established pathways.
- Provide initial and frequent status updates to concerned employees. Apprise anonymous concerned employees who use hotlines of the process for receiving feedback while maintaining anonymity.
- Make the M&H Employee Concerns Program Review Committee permanent in order to provide for continuous review of worker satisfaction and for development of improvement recommendations as required.

**APPENDIX A**

**EVALUATION APPROACH AND  
TEAM COMPOSITION**



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## APPENDIX A

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### EVALUATION APPROACH AND TEAM COMPOSITION

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#### CONCEPTUAL BASIS FOR EVALUATION

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As a basis for Oversight evaluations of environment, safety, and health (ES&H) programs, the Department of Energy (DOE) Office of Environment, Safety and Health (EH) has formulated a conceptual framework that characterizes the principles, programs, and disciplines that are essential elements of a sound safety management program. This approach to oversight is based on the fundamental premise that line managers are responsible for managing safety through proper work planning, hazards analysis, and hazard control. The adequacy of the systems, processes, and procedures managers use to assure environmental protection and worker health and safety are assessed against a set of clearly defined principles and accompanying criteria. This generic framework can accommodate the wide range of operations, hazards, and management styles at DOE facilities. At the same time, the framework serves as a template against which managers can assess the adequacy of current safety efforts and from which, over time, an understanding of site-specific trends and inter-site comparisons can be drawn.

The conceptual framework centers around three of the five fundamental management principles<sup>1</sup> identified by DOE in an October 1994 letter to the Defense Nuclear Facilities Safety Board.

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<sup>1</sup>Five guiding principles are identified in the DOE's letter: line management responsibility for safety, comprehensive requirements, competence commensurate with responsibilities, independent oversight, and enforcement. The last two are performed by the Office of Oversight and other Departmental elements. The evaluation of the Pantex Plant, therefore, focused on its effectiveness in implementing the first three of the five guiding principles, which are directly applicable to line management.

The letter included a comprehensive description of the functions that the Department deems necessary to fulfill its mandate under its enabling legislation to provide "reasonable assurance that the safety and health risk of operating personnel and the public be minimized."

An overall view of the process for evaluating the effectiveness of the implementation of each guiding principle and the overall safety management program is depicted in Figure A-1.

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#### EVALUATION PRINCIPLES AND CRITERIA

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The three applicable fundamental principles for an effective safety management program and the applicable evaluation criteria are shown in Figures A-2 through A-4. These principles are discussed in below.

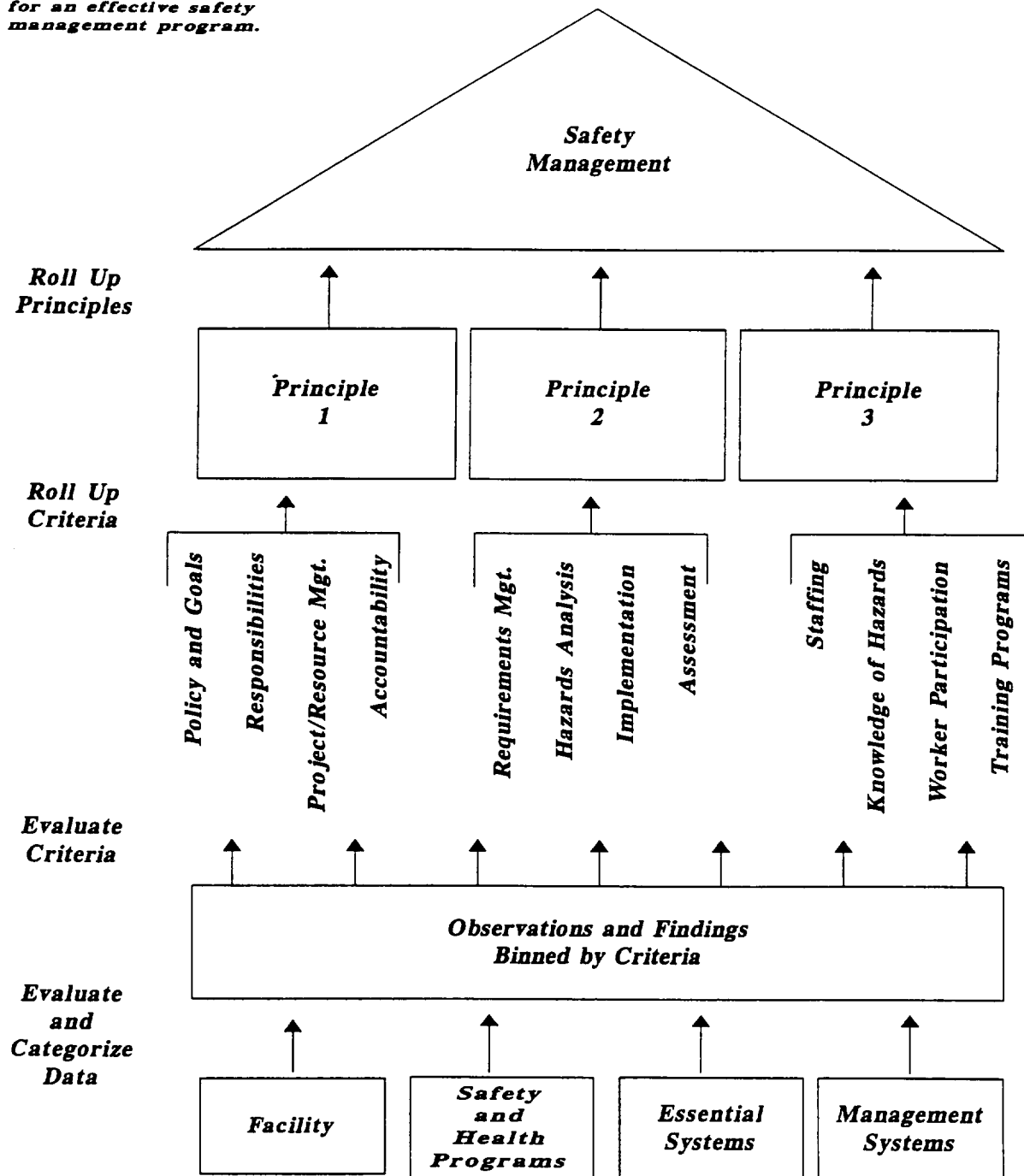
***Principle #1 - Line managers are responsible and accountable for safety.***

Organizations that have effective safety management programs place accountability and responsibility for safety with line managers. Accordingly, line management personnel must ensure that the safety management program includes safety policies and goals that are clearly articulated and communicated; well defined responsibilities and authorities; effective management systems to identify, analyze, prioritize, and mitigate risks; and a process for ensuring that management is accountable for its safety performance.

***Principle #2 - Comprehensive requirements exist, are appropriate, and are executed.***

An effective safety management system must include processes to identify, communicate,

*The apex reflects the evaluation of the overall Pantex safety management programs. It depicts a rollup of the three guiding principles determined by the Department as necessary for an effective safety management program.*



**Figure A-1. Oversight's Evaluation Process**

***Principle #1 - Line managers are responsible and accountable for safety.***

**Criterion 1-1: Clear Safety Policies and Goals**

Line management implements effective safety policy and goals that reflect Departmental policies and industry standards and assures a safety culture that permeates every level of the organization.

**Criterion 1-2: Defined Responsibilities and Authorities**

Line managers are responsible and accountable for ensuring that DOE facility operations and work practices are performed in a manner that provides adequate protection to worker safety and health, the public, and the environment. Accordingly, line managers must ensure that:

- A clear division of responsibilities is established and communicated.
- Line managers have the authority to make and implement decisions regarding ES&H that are commensurate with their responsibilities.
- There are clear mechanisms throughout the line organizations for adjudicating disputes among line managers where discrepancies are believed to exist between work goals and ES&H management needs.

**Criterion 1-3: Project and Resource Management Systems**

Decision makers at appropriate levels of the organization must be capable of understanding and synthesizing program goals and ES&H risks in order to effectively deploy resources adequate to address both. Line managers must manage safety and its attainment by establishing management information systems to ensure that:

- Hazards are analyzed and understood.
- Appropriate hazard mitigation actions are identified and are in place.

**Criterion 1-4: Line Management Accountability for Performance**

Line managers are accountable for ES&H performance. Performance should be explicitly tracked and measured, and inadequate performance should have visible and meaningful consequences. Line managers must execute actions to attain and continuously improve the safety of their operations by ensuring that:

- Safety-related matters are reviewed, monitored, and audited on a regular basis.
- Findings resulting from these reviews, monitoring activities, and audits are resolved in a timely manner.

**Figure A-2. Criteria for Principle #1**

***Principle #2 - Comprehensive requirements exist, are appropriate, and are executed.***

**Criterion 2-1: Requirements Management**

Processes must be in place to ensure that requirements are identified, transmitted, and implemented, and that they provide adequate protection to worker safety and health, the public, and the environment.

**Criterion 2-2: Hazards Analysis**

Hazards generally change as a facility cycles through the phases of design, construction, operation and maintenance, decommissioning and decontamination, and environmental restoration. It is thus important to continually analyze and assess hazards in order to identify the relative significance and application of Departmental requirements. To effectively mitigate hazards, line managers must ensure that:

- Requirements are established that are commensurate with hazards throughout the life cycle of the facility.
- Internal requirements are based on hazards analyses and, when implemented, are sufficient to ensure safety.

**Criterion 2-3: Implementation of Requirements**

Line managers are responsible for ensuring that programs are implemented in compliance with defined requirements.

- Site-specific implementation plans and associated operating procedures define standards that are used to comply with applicable safety requirements.
- The site is in compliance with applicable Federal and state statutes and Departmental policy and requirements.

**Criterion 2-4: Assessment Programs**

Line management must establish and implement effective methodologies to monitor, review, and evaluate adherence to all applicable Departmental requirements and industry standards for safety and to achieve timely correction where warranted.

**Figure A-3. Criteria for Principle #2**

***Principle #3 - Competence is commensurate with responsibilities.***

**Criterion 3-1: Staffing and Qualifications**

The organization supports effective safety management by assuring appropriate levels of staffing and competence at every level. The organization has in place the means to:

- Determine the appropriate levels of staffing, experience, and training for each function, including consideration of responsibilities, activities, hazards, and schedules.
- Assure that subcontractors employed on site are adequately trained and qualified on job tasks, hazards, and DOE and contractor safety policies and requirements.
- Clearly identify vertical and horizontal lines of interface, communication, and support.
- Provide managers and supervisors with sufficient authority, staffing, and support to implement assigned responsibilities, analyses, and decisions.
- Develop and implement strategies for recruitment and retention of competent personnel.

**Criterion 3-2: Technical Competence and Knowledge of Hazards**

Workers and managers are technically competent to perform their jobs and are appropriately educated and knowledgeable of the hazards associated with site operations. Line managers must ensure that:

- Workers have the technical capability to recognize and respond appropriately to workplace hazards.
- Management, technical staff, and workers have the necessary levels of education, training, and experience.

**Criterion 3-3: Worker Participation and Empowerment**

Line managers recognize that active participation by workers is essential in maintaining and improving protection to worker safety and health, the public, and the environment. Therefore, line managers must ensure that:

- Workers and managers are empowered to take appropriate action in the face of hazards encountered during normal and emergency conditions, including the right to refuse unsafe work assignments.
- Processes for raising safety issues are established.
- Incentives are in place to promote a safety-conscious culture and worker participation and involvement in safety management.

**Criterion 3-4: Training Programs**

Line managers must establish and implement processes to ensure that training programs effectively measure and improve performance, and identify additional training needs.

**Figure A-4. Criteria for Principle #3**

execute, and monitor all applicable requirements, including Federal and state regulations as well as DOE requirements. Accordingly, responsibility for managing requirements must be established, a hazards analysis process must be implemented, applicable requirements must be identified and translated into procedures, procedures must be implemented by personnel in the facilities, and systems to assess compliance and effectiveness and to correct non-compliant conditions must be in place.

DOE is in the midst of a significant change in its approach to analyzing hazards and identifying applicable requirements that must be implemented to control those hazards. Most notably, DOE is transitioning from orders to rules. The criteria for Principle #2 are intended to be sufficiently flexible to encompass all of the current and developing approaches to analyzing hazards and identifying appropriate requirements. The following paragraphs clarify the scope of the individual criteria under this principle.

The first criterion focuses on the management functions that are necessary to implement hazards analysis processes. Included in this criterion are functions such as identifying individuals and teams to conduct hazards analyses at various facilities, assuring that the necessary resources are available, prioritizing activities, reviewing progress and status, maintaining documentation, establishing configuration control, evaluating and approving site-specific processes, and determining whether expectations are being met. In short, the first criterion focuses on the infrastructure underlying the second principle.

The second criterion focuses on the effectiveness of the actual process for analyzing hazards and identifying requirements. It encompasses the processes for translating the applicable requirements to site- and facility-specific procedures, and for updating those procedures as conditions change. The emphasis is on whether the processes used at the site are achieving the desired goal, which is a set of requirements and procedures that, if implemented, will effectively control the hazards. Also important is whether the site has a formal, current authorization basis for its facilities and whether the site is meeting

established commitments for developing such an authorization basis.

The third criterion focuses on implementation of requirements sitewide and at specific facilities. The emphasis is on whether the requirements are understood at the working level and implemented as intended.

The fourth criterion encompasses the various programs that assess compliance and effectiveness and provide feedback to line management. These include self-assessments, surveillances, audits, quality assurance, management walk-throughs, and similar formal and informal measures.

### *Principle #3 - Competence is commensurate with responsibilities.*

A fully functioning safety management system will have workers and managers who are technically competent to perform their jobs and who are appropriately educated and knowledgeable of the hazards associated with site operations. Management must assure that effective training programs are in place and that sufficient qualified staff are available. Workers must have the technical capability to recognize and respond to workplace hazards. Active worker participation in maintaining and improving the safety and health of workers, the public, and the environment, including workers' ability to stop work when they recognize unsafe practices, is essential.

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## EVALUATION RATING SYSTEM

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The ratings for each of the guiding principles and the safety management program are graphically represented using a color rating scheme. The colors and their meanings are as follows:

Green:	Effective performance.
Yellow:	Improvement needed
Red:	Significant weakness

This color rating system is not intended to provide a relative rating between specific facilities or programs at different sites because of the

many differences in missions, hazards, facility life cycles, and use of sampling techniques.

A "green" rating denotes effective performance, reflecting effective implementation of the Department's standards for an effective safety management program (each principle with its associated criteria). Although some deficiencies or issues may have been identified during an evaluation, a green rating is appropriate if those deficiencies or issues do not degrade the overall effectiveness of the program.

A "yellow" rating indicates that improvement is needed. Deficiencies identified are more substantial and systemic and require significantly increased management attention.

A "red" rating indicates a significant weakness that requires immediate senior management focus, attention, and action. A red rating normally indicates significant programmatic or systemic weakness that is pervasive or of high consequence to the overall effectiveness of the safety management system.

Each of the guiding principles that constitute the basis for establishing an effective safety management program is a crucial element of a process to ensure that DOE-controlled operations are performed in a manner that will protect workers, the public, and the environment. Using these principles and their associated criteria to evaluate safety management program effectiveness requires careful consideration of the nature of the specific activity or facility being reviewed, its relationship with and impact on other activities and facilities, its life cycle phase, and the risk it presents to the achievement of ES&H goals.

While the significance and application of each principle and its associated criteria may vary by circumstance, it is imperative that the implications of each principle for effective safety management be weighed and considered on the basis of hazards and risks to workers, the public, and the environment.

The guiding principles are interrelated and mutually supportive elements of the overall safety management system. Clear articulation

and communication of lines of authority and responsibility for safety must consider and correlate with the establishment and implementation of appropriate requirements. Personnel responsible for executing these requirements must understand the hazards and their roles in controlling the hazards, and must be competent to perform their assigned duties. Hence, the evaluation of the safety management system must consider the guiding principles both individually and in concert.

The process for evaluating the effectiveness of each guiding principle is as follows. First, the evaluation results are sorted and binned according to the individual criteria, and each criterion is evaluated and rated individually. Next, each principle is evaluated according to the associated criteria, considered separately and collectively—that is, the evaluations of individual criteria are "rolled up" to a higher level evaluation of the individual guiding principles. Finally, the overall safety management program is evaluated and rated by "rolling up" the evaluation of the individual guiding principles.

The rollup process is not a mechanical or numerical scoring exercise. Rather, it is a deliberative process involving all levels of the Oversight evaluation team, from the inspectors who examine individual facilities and topics to the evaluation team management and the Deputy Assistant Secretary for Oversight. The rollup evaluations consider:

- Whether risks to ES&H currently exist or will exist in the future if present circumstances remain unchecked
- Whether the risks are unique to a specific criterion, principle, activity, or facility
- The synergistic effects of two or more principles or criteria
- Initiatives that are planned or in progress, and their expected results
- The impact that the level of adherence to a specific principle or criterion has on the effectiveness of the overall safety management program.

In practice, the evaluation process involves a number of iterations to assure that the results are valid and representative of the safety management program.

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## EVALUATION PROCESS

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The Office of Oversight's evaluation process measures the effectiveness of DOE and contractor line management in achieving ES&H objectives. The goal of the approach used is to fairly and accurately assess the effectiveness of a site's overall safety management program in a way that provides value to line management.

This process focuses on safety management in the context of the guiding principles rather than on serial evaluations of individual issues or technical disciplines. The Office of Oversight strives to provide a balanced assessment of performance, emphasizing strengths as well as weaknesses. Rather than a list of non-compliances or specific deficiencies, evaluation results discuss root causes, systemic weaknesses, obstacles to improvement, and suggestions for approaching solutions. The program actively seeks and incorporates the insights and concerns of line management, workers, regulatory bodies, and other interested parties.

The evaluation was conducted according to formal protocols and procedures, including an Appraisal Process Guide, which provides the general procedures used by the Oversight program for conducting inspections and reviews, and a Safety Management Evaluation Plan, which outlines the scope and conduct of the evaluation. Training sessions were conducted to ensure that all team members were informed of the evaluation objectives, procedures, and methods. The evaluation team collected data through interviews, document reviews, walkdowns, observation of activities, and performance testing. Interviews were conducted with program office, operations office, area office, and contractor personnel, including managers, technical staff, hourly workers, and union representatives.

The priorities and focus of the evaluation centered on the site facilities, hazards, vulnerabili-

ties, issues, and ongoing activities. Performance weaknesses, vulnerabilities, and data were examined for all major facilities and major ES&H topical and functional areas. Available data from other sources, such as DOE Headquarters reviews, operations office and area office appraisals, EH Resident surveillances, Defense Nuclear Facilities Safety Board letters and trip reports, information from the Occurrence Reporting and Processing System, and the performance indicator program, were included in the scope of this evaluation.

Based on the review of documents and tours during the planning process, the Oversight team selected facilities and programs for primary focus. At each site, the team conducted vertical reviews to determine the effectiveness of the safety management system in place. The vertical reviews examined selected programs, such as radiological protection. These vertical reviews examine program policies and management programs, as well as program implementation at selected facilities and process operations, addressing procedures, hardware, and knowledge and qualifications of personnel on the "shop floor." During the planning process, the Oversight team also identified a number of site-specific focus areas, such as work planning and employee involvement, which were reviewed in depth.

Templates for collating data on a daily basis were used as an internal team communication and analysis tool. Weaknesses, strengths, and other indicators were entered into the template daily and used for coordinating the flow of data. The template was designed for ease of analysis relative to a specific guiding principle and associated criteria. This analysis formed the basis for integrating information, identifying management issues, developing ratings for performance under each guiding principle and its criteria, and writing the evaluation report. The analysis of data also provided the basis for redirecting the team during the evaluation, as necessary. The information was evaluated and analyzed daily by the evaluation team.

At all stages of the process, the preliminary results were shared with representatives of the Headquarters Office of Defense Programs, the

Albuquerque Operations Office, the Amarillo Area Office, and site contractors. Their comments on the factual accuracy and completeness of the data helped determine the validity of the data and guide additional data collection efforts as appropriate. Key facts and issues were reviewed daily with site points of contact to verify their accuracy. Team management provided daily morning briefings to site management on emerging issues.

Based on observations, the team analyzed the effectiveness of program elements with respect to each criterion and each guiding principle. Results and conclusions were documented and ratings assigned. The team evaluated potential options for improving operations and generated candidate actions for enhancing the safety management system. Finally, the report was reviewed by a management review board consisting of senior analysts and managers to ensure that the reported results reflected objectivity, comprehensive analysis, and supportable conclusions. The results of these efforts were provided in a draft report to DOE management for factual validation at the exit briefing.

The results provide useful insight into the effectiveness of the overall safety management programs at the Pantex Plant. Evaluation results should be viewed in the context of the scope of the evaluation and the sample of facilities and topics selected for review. Strengths and weaknesses identified during this evaluation may not be representative of all other areas and contractors. Nonetheless, since the facilities and programs selected for evaluation encompass a diverse cross-section of the site activities and ES&H programs, the Oversight team believes that the facilities selected for review represent a valid sample of overall ES&H safety management program performance.

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### **TEAM COMPOSITION**

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To reflect the emphasis placed on the three guiding principles of safety management, a core group of safety management specialists evaluated the application of these principles. Specialists focused on each of the three guiding principles.

In addition, specialists were assigned to collect data at selected Pantex facilities. The specialists were assigned to evaluate the effectiveness of various implementing programs or technical disciplines (radiological protection, conduct of operations, industrial safety/hygiene, process safety, essential systems, explosive safety, and environmental restoration).

Team composition is as follows:

#### **Deputy Assistant Secretary for Oversight**

Glenn Podonsky

#### **Associate Deputy Assistant Secretary**

Neal Goldenberg

#### **Director, Office of ES&H Evaluations/Team Advisor**

S. David Stadler

#### **Team Leader**

Michael Kilpatrick

#### **Deputy Team Leader/Pantex Facility Team Leader**

Frank Russo

#### **Associate Deputy Team Leader**

Harry Pettengill

#### **Line Management Responsibility**

Charles Lewis  
William Eckroade

#### **Comprehensive Requirements**

Bradley Peterson  
Roger Griebel

#### **Competence Commensurate with Responsibility**

Thomas Kyriakakis  
Frank Cicchetto

**Pantex Facility Team**

Dave Allard (Radiological Protection)  
Gerald Toomey (Engineering/Configuration  
Management)  
Mike Tuggle (Industrial Safety/Industrial  
Hygiene)  
William Harrison (Conduct of Operations)  
Dennis Kochniuk (Process Safety)  
Robert Burrows (Engineering/Configuration  
Management)  
Robert Newbern (Explosives Safety)  
Keith Bracknell (Groundwater Protection)  
Jerry Grayson (Technical Advisor on Weapons  
Safety)

**Administrative Team**

Mary Anne Sirk  
Tom Davis  
Kathy Moore  
Tracey Blank  
Jan Hill  
Kelly Williams  
Yolanda Parker

**Quality Review Board**

Neal Goldenberg  
Mari Jo Campagnone  
Dean Hickman